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August 1, 2019

Hillary Young  
Land Protection Division  
Department of Environmental Quality  
P.O. Box 1677  
Oklahoma City, OK 73101-1677

RECEIVED

AUG 01 2019

LAND PROTECTION DIVISION  
DEPT. OF ENVIRON. QLTY

RE: Muskogee Generating Station  
Inactive Coal Combustion Residuals Ash Pond  
Annual Groundwater Monitoring Report

Ms. Young:

As per OAC 252:517-9-1(e), Oklahoma Gas and Electric Services (OG&E) is submitting the required Annual Groundwater Monitoring Report for the Inactive CCR Impoundment located at OG&E Muskogee Generating Station. This report is due no later than August 1, 2019 as per OAC 252:517-15-5(b)(5).

If you have any questions concerning this report, please contact Tad Dow by either his office (405-553-3349) or cell phone (405-708-9964).

Sincerely,

A handwritten signature in blue ink, appearing to read "Les Waller", is written over a horizontal line.

Les Waller  
Mgr Water Quality/Operational Chemistry

Enclosures

**Annual Groundwater Monitoring Report  
For the Inactive CCR Impoundment at Muskogee Power Plant**



**FACILITY LOCATION:**

5501 Three Forks Road  
Ft. Gibson, OK 74434



Revision 0  
Date: July 29, 2019

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## **1.0 INTRODUCTION**

Oklahoma Gas and Electric Company (OG&E) has prepared this initial annual groundwater and corrective action monitoring report for the Muskogee Power Plant (MK) in accordance with the Oklahoma Department of Environmental Quality (ODEQ) OAC 252:517-15-5(b)(5), Groundwater Monitoring and Corrective Action for Inactive Coal Combustion Residuals (CCR) Surface Impoundments, and OAC 252:517-9-1(e) Annual Groundwater Monitoring and Corrective Action Report requirements. This annual groundwater and corrective action monitoring report provides the information to support the establishment of baseline background groundwater conditions in accordance with OAC 252:517-9-4 Groundwater Sampling and Analysis requirements for Calendar Year (CY) 2018. The OG&E MK inactive CCR impoundment is located in Fort Gibson, Oklahoma (see Figure 1-1).

## **2.0 MK CCR IMPOUNDMENT STATUS**

The inactive CCR Impoundment at the OG&E MK power plant ceased receiving bottom ash on October 14, 2015. OG&E subsequently filed a Notice of Intent to initiate closure of the inactive impoundment on December 10, 2015. The clean closure of the MK inactive CCR surface impoundment was initiated in October 2018 and is now substantially complete as of July 29, 2019. Clean closure activities for the inactive CCR impoundment in CY2018 and CY2019 included: removal and off-site disposal of all CCR within an ODEQ permitted solid waste disposal facility; removal of impoundment berms and regrading of all soils to match the surrounding topography; and, hydro-seeding of the surface soils in July 2019. Once the surface soils have been successfully revegetated, OG&E will submit to the ODEQ certification for the closure of the inactive CCR impoundment.



Figure 1-1 Location Map

### 3.0 GROUNDWATER MONITORING ACTIVITIES

Owners and operators of electric utility CCR units are required to implement a groundwater monitoring system and program that together are capable of detecting CCR impacts on groundwater quality, if any, underlying each utility CCR landfill and/or CCR surface impoundment.

The groundwater monitoring system at the MK inactive CCR impoundment consists of five appropriately located monitoring wells (two upgradient and three downgradient wells) capable of monitoring the quality of background groundwater and the quality of groundwater passing the CCR waste boundary. Monitoring wells were installed in order to yield representative groundwater samples from the uppermost aquifer. The ODEQ CCR Rule requires groundwater sampling at utility CCR-waste landfills/impoundments for specific chemical constituents of potential concern (COPCs). If the groundwater monitoring system demonstrates a verified exceedance of a groundwater protection standard for any of the identified COPC through statistical evaluation, the owner or operator must initiate corrective action.



OG&E initiated baseline groundwater monitoring in accordance with the CCR rule in March 2018. The initial eight rounds of baseline monitoring sampling and analysis were completed prior to April 17, 2019. Data for the baseline monitoring events are available at the time of this report.

The groundwater monitoring network consists of 5 monitoring wells currently in place around the MK inactive CCR Impoundment. To more thoroughly assess background groundwater concentrations, monitoring well (MW-5) was included for background groundwater monitoring during this reporting period. As described in OAC 252:517-9-4(e), a determination of background quality may include sampling of wells that are not hydraulically upgradient of the CCR management area where sampling will provide an indication of background groundwater quality that is as representative as that provided by the upgradient wells.

Groundwater samples and elevation data are collected from the 5 monitoring wells. The 5 monitoring wells are screened at the water table (approximately 7 to 14 feet below ground surface). Horizontal spacing between the downgradient shallow alluvial aquifer monitoring wells ranges from approximately 350 to 1500 feet. The Monitoring Well locations are identified in Figure 2-1. Groundwater elevation data are used to identify upgradient and downgradient monitoring points and to determine the potential influence of the Arkansas River on groundwater conditions. The monitoring wells consist of 2-inch nominal inner-diameter polyvinyl chloride (PVC) casing and screen. Monitoring well construction included placement of clean silica sand in the screened interval and an annular seal of bentonite to the near surface. Monitoring well surface completions consist of a lockable stick-up surface casing set in a concrete pad and placement of protective bollards. Review of monitoring records and well inspections indicate the monitoring wells have been operated and maintained adequately to meet the design specifications of the monitoring program.

The uppermost aquifer in the vicinity is the Arkansas River alluvial aquifer. In general, the sediment grain size increases with depth; clays, silts, and fine sands are typically present from 0 to 30 feet below ground surface (bgs) where the water table occurs; coarser sands and gravels are typically present below 30 feet. In general, the subsurface geology in the vicinity of the CCR impoundments includes a layer of fine-grained materials (silts and clays) overlying predominately fine sand with some sand and gravel at depth.





Figure 2-1 Monitoring Well Location Map

### 3.1 Monitoring Well Inspection and Groundwater Sample Collection

Monitoring Well inspections included observations for the condition of the protective casing/vault and surrounding ground surface prior to each groundwater sampling event. Any sediment deposited on the monitoring well pads was removed as part of the inspections. During each sampling event, the monitoring wells were inspected and documented as appropriate (Attachment 2). It should be noted that the berm surrounding the inactive CCR impoundment has been removed, regraded to match the surrounding land contours, and initiated revegetation as of July 29, 2019.

Prior to each groundwater sampling event, the total well depth of each well in the monitoring network is measured to evaluate the well condition and potential sediment accumulation in the well. Total well depth measured during the inspections are presented in Attachment 2. No significant screen occlusion was determined to be present during the sampling events. In accordance with the Field Procedures, following the eight rounds of baseline sampling, the frequency of measuring total well depths may be adjusted based on review of the collected data.

Sampling was conducted using dedicated submersible pump that was flushed with Deionized water between purging and sampling. Prior to sample collection, the temperature and pH of the purge water were measured. The readings were recorded on well sampling records or in a field notebook (Attachment 2). Upon stabilization, unfiltered samples were collected in laboratory-supplied containers. The groundwater sampling records for the baseline monitoring events are included in Attachment 2. During each of the baseline sampling events, a field duplicate sample was collected for quality assurance/quality control (QA/QC) purposes.

### **3.2 Analytical Parameters**

Groundwater samples were analyzed for the parameters specified in OAC 252:517 Appendix A and B (Tables 2.4 and 2.5, respectively) for each of the baseline monitoring events. The laboratory analyses were conducted by Accurate Environmental Laboratories located in Stillwater, Oklahoma. Analyses were conducted by the laboratory in accordance with the procedures and methods described in the United States Environmental Protection Agency (USEPA) Manual SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (September 1986)," as updated and/or in accordance with other approved testing procedures.

Accurate Environmental Laboratories provided prepared sample containers for each monitoring event. Analytical data for each sampling event is reported as total recoverable (i.e., unfiltered) sample results and are included in Attachment 2. Following receipt of the final laboratory analytical reports of sampling, Groundwater Stats Consulting completed an analytical data quality assessment and validation for the groundwater samples collected during the baseline and initial detection monitoring events.

## **4.0 GROUNDWATER FLOW CONDITIONS**

Groundwater levels were measured at each of the monitoring wells included in the monitoring network during each sampling and monitoring event. The groundwater elevations measured in wells during the monitoring are listed in Attachment 2. A groundwater flow map (Figure 3-1) was prepared using water level measurements from the monitoring events for the shallow portion of the alluvial aquifer. The groundwater flow direction in the alluvial aquifer is to the west-southwest and south southeast toward the Arkansas River, based on the monitoring events conducted between March 2018 and April 2019. Groundwater flow direction at the inactive CCR impoundment has been observed to be consistent with only minor temporal variations. The groundwater contour map shows the groundwater elevations in the shallow portion of the alluvial aquifer has generally ranged from 496 feet to 499 feet, with groundwater flow directions predominantly toward the Arkansas River.

The average horizontal linear groundwater velocity for the shallow portion of the alluvial aquifer was estimated based on hydraulic conductivity, horizontal gradient, and the estimated porosity of the formation. Groundwater flow velocities for each of the monitoring events are summarized in Attachment 2.



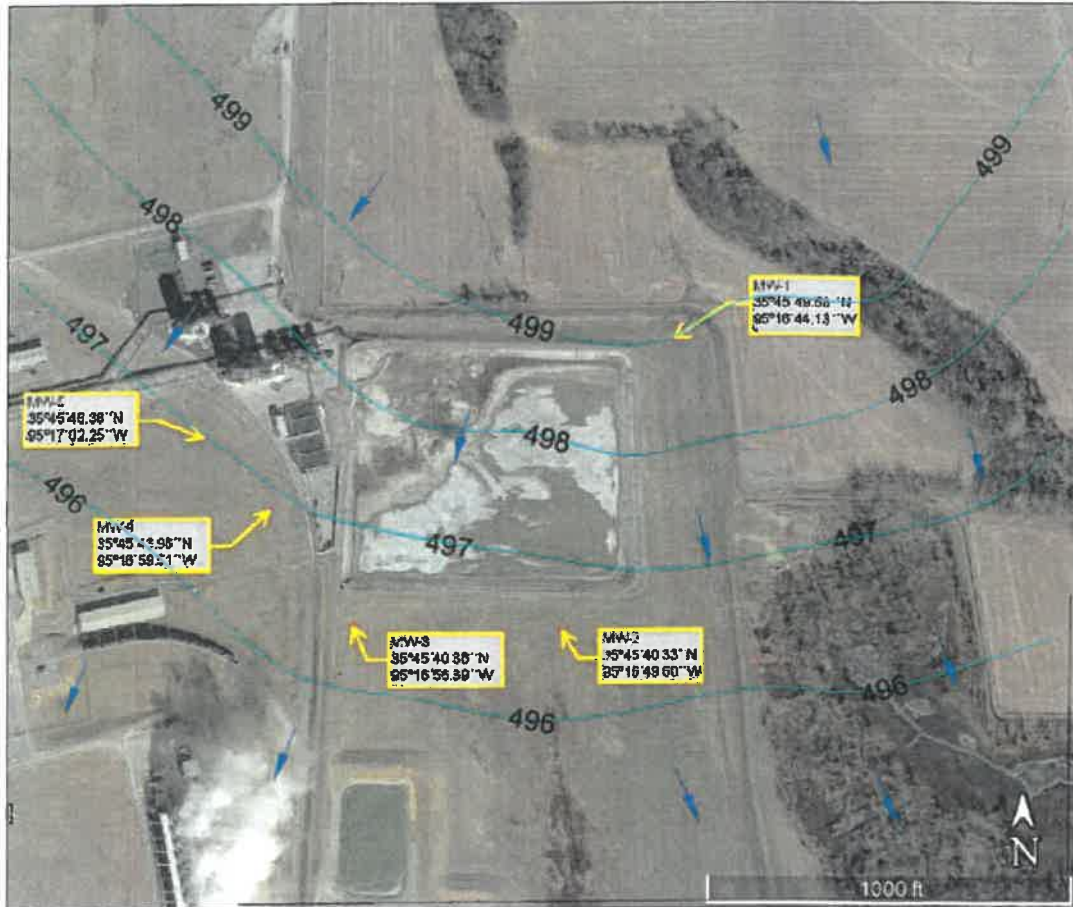


Figure 3-1 Groundwater Flow Map

## 5.0 GROUNDWATER MONITORING AND ANALYSIS

Groundwater sample collection records for the eight baseline monitoring events are provided in Attachment 2 along with the associated laboratory analytical reports. Analytical results for groundwater samples collected during the baseline monitoring events are also summarized in Attachment 2. The Well Completion and Plugging Report are included in Attachment 3. As part of assessment and reporting requirements under the ODEQ CCR rule, the groundwater monitoring data are subjected to statistical evaluation to demonstrate compliance with monitoring goals. Evaluation components include:

- Statistical summaries for the data sets obtained (on a per-well, per-parameter basis)
- Preparation of trend plots (concentration vs. time)
- Inter-well comparisons (downgradient vs. upgradient)
- Intra-well comparisons (vs. baseline conditions at a given well)

The statistical methods used in these evaluation steps for the MK inactive CCR impoundment are presented in the Groundwater Statistical Analysis provided in Attachment 1. The procedures in the Groundwater Statistical Analysis were selected in accordance with the ODEQ CCR rule, utilizing methodology presented in the USEPA's *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance* (Unified Guidance) (USEPA, 2009). The present evaluation utilizes the statistical methods presented therein to evaluate monitoring data from groundwater samples collected during the baseline monitoring events.

Baseline monitoring under the ODEQ CCR rule occurred at MK inactive CCR impoundment during eight monitoring events conducted between March 2018 and April 2019. These events represent the selected baseline period required for both Inter-well and Intra-well comparisons.

The initial ten rounds of baseline groundwater monitoring data were collected and analyzed for the OAC 252:517 Appendix A and B constituents (Tables 2.4 and 2.5, respectively). The baseline monitoring data and analysis for the MK inactive CCR impoundment are presented in Attachment 1. Statistical summary information for each data set is included along with trend analysis results in Attachment 1.

Groundwater monitoring at the MK inactive CCR impoundment is currently conducted under Detection Monitoring status per the ODEQ CCR rule. As such, the seven Appendix A constituents were analyzed in the monitoring event samples. The statistical methods selected for use are dependent upon the data and distributions and should consider the specific constituents and the nature of local hydrogeologic conditions. Depending on characteristics of the site and the groundwater monitoring data, a mix of inter-well (comparison vs. upgradient conditions) and intra-well (comparison vs. baseline) tests may be warranted. The statistical methods used for the inter-well and intra-well approaches are selected based on these factors as well as consideration of natural temporal or spatial variability of the concentrations of the groundwater constituents. Substantial natural spatial variability may necessitate intra-well methods. This statistical analysis was completed using both inter-well and intra-well approaches for the purpose of determining if a statistically significant increase (SSI) has occurred at MK inactive CCR impoundment.

A preliminary statistical analysis was conducted using the ten rounds of baseline data to initially assess the constituent data and determine the most appropriate statistical approach(es) for the data. The data were examined for outliers, the percentage of non-detect values, and to determine the statistical distribution. Time series plots and maps were used to evaluate the potential presence of temporal or spatial variations in constituent concentrations. All of the Appendix A and B constituents occur naturally in the environment. Naturally occurring constituents may vary substantially in concentration across the monitoring network due to natural hydrogeologic or geochemical factors (i.e., exhibiting spatial variability). Where this occurs, an inter-well analysis is not appropriate where this occurs. Constituent concentrations greater than upgradient conditions might be incorrectly attributed to impact from MK inactive CCR impoundment, when the differences are natural and unrelated to MK inactive CCR impoundment and due to locally varying distributions of groundwater constituents. In such cases, an intra-well approach is appropriate.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

Groundwater flow in the shallow portion of the alluvial aquifer in the vicinity of MK inactive impoundment is predominantly to the west-southwest and south southeast, toward the Arkansas River. The groundwater contour map (Figure 3-1) indicates the monitoring network is sufficient and has appropriately located upgradient and downgradient well locations.

A statistical evaluation of groundwater monitoring data collected during the baseline period (March 2018 to April 2019) has been conducted in accordance with the ODEQ CCR rule and Unified Guidance for assessing groundwater data (USEPA, 2009). This evaluation was successful in characterizing the baseline data sets, assessing the baseline data for trends, and generating inter-well upgradient background reference values and intra-well baseline values against which future monitoring data may be evaluated.

Key results of the evaluation include:

- Constituent concentrations appear to vary between the two background wells. Evaluation of the baseline period data indicates spatial variability in groundwater collected at different monitoring wells at the site, requiring intra-well comparisons.
  - Concentration trends over time were observed in some baseline data sets at downgradient wells, but not in the upgradient well.
  - Inter-well baseline values have been calculated from the baseline data for two background well (MW-1 and MW-5).
  - Intra-well baseline values have been calculated on a per-constituent, per-well basis for Appendix B constituents.
- o Inter-well comparisons – monitoring results at downgradient wells are consistent with upgradient background conditions during the baseline period. However, observations were above upgradient background conditions. The initial exceedances will be monitored on a bi-annual basis through collection of confirmation samples.
- o Intra-well comparisons – The September 2018 monitoring data exceed their corresponding intra-well baseline values (Calcium – MW-3 & MW-4, Chloride – MW-3, MW-3 & MW-4 and Sulphate - MW-3 & MW-4). These data sets all exhibited increasing trends over time during the baseline period, and the September 2018, January and April 2019 data appear consistent with the apparent trends. The initial exceedances will be monitored on a bi-annual basis through collection of confirmation samples.

## **7.0 REFERENCES**

- United States Department of Agriculture (USDA), 2015, Web Soil Survey, Natural Resource Conservation Service
- United States Environmental Protection Agency (USEPA), 2009, Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, EPA 530/R-09-007, March 2009.
- USEPA, 2015, Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 40 CFR Parts 257 and 261, Federal Register, Vol. 80, No. 74, April 17, 2015.



## 8.0 STATEMENT OF CERTIFICATION

I hereby certify, as a Professional Engineer in the State of Oklahoma, that the information in this document was assembled under my direct supervisory control. I certify that to the best of my knowledge and belief, the information presented in this document are correct.

Suraj A. Balan, P.E.

8/1/2019

Date

Oklahoma Certificate of Authorization Number: 159



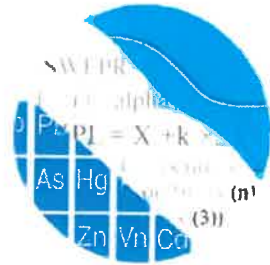


## **Attachment 1**

### **Groundwater Statistical Analysis**



## GROUNDWATER STATS CONSULTING



August 1, 2019

OGE Energy Corp.  
Attn: Mr. Tad Dow  
321 N. Harvey Ave.  
Oklahoma City, OK 73102

Dear Mr. Dow,

Groundwater Stats Consulting, formerly the statistical consulting division of Sanitas Technologies, is pleased to provide the background screening and statistical analysis of the April 2019 groundwater data for OGE Energy Corp.'s Muskogee Power Plant Emergency CCR Pond. The analysis complies with the federal rule for the Disposal of Coal Combustion Residuals from Electric Utilities (CCR Rule, 2015) as well as with the USEPA Unified Guidance (2009).

Sampling began in March 2018 for each of the groundwater monitoring wells. The monitoring well network, as provided by OGE Energy Corp., consists of the following: upgradient wells MW-1 and MW-5; and downgradient wells MW-2, MW-3 and MW-4. The Muskogee Power Plant Emergency CCR Pond is an inactive coal bottom ash pond that received CCR material during dewatering bin maintenance or malfunction and as a means to flush lines. The impoundment ceased operations on October 14, 2015. The impoundment contains a liner system that is constructed with 6-inches of soil and bentonite overlain with 6-inches of cement stabilized aggregate on both the side slopes and on the bottom.

Data were sent electronically to Groundwater Stats Consulting, and the statistical analysis was reviewed by Dr. Jim Loftis, professor emeritus of Civil and Environmental Engineering at Colorado State University and Senior Advisor to Groundwater Stats Consulting.

The following constituents were evaluated: Appendix III parameters – boron, calcium, chloride, fluoride, pH, sulfate, and TDS. While the Appendix IV parameters are plotted as discussed below, the site is currently in Detection Monitoring and no statistical analyses are required at this time on these Assessment Monitoring parameters: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, combined radium 226 & 228, fluoride, lead, lithium, mercury, molybdenum, selenium, and thallium.

Time series plots for Appendix III and IV parameters at all wells are included in this report. Additionally, box plots are included for all constituents at upgradient and downgradient wells. The time series plots are used to initially screen for suspected outliers and trends, while the box plots provide visual representation of variation within individual wells and between all wells (Figures A and B).

Proposed background data at all wells were evaluated during the January 2019 analysis for the following: 1) outliers; 2) trends; 3) most appropriate statistical method for Appendix III parameters based on site characteristics of groundwater quality data upgradient of the facility; and 4) eligibility of downgradient wells when intrawell statistical methods are recommended. Power curves were provided to demonstrate that the selected statistical methods for Appendix III parameters comply with the USEPA Unified Guidance recommendations as discussed below.

#### **Summary of Statistical Method:**

- 1) Intrawell prediction limits, combined with a 1-of-2 resample plan for boron, fluoride and pH; and
- 2) Interwell prediction limits combined with a 1-of-2 resample plan for calcium, chloride, sulfate and TDS.

Parametric prediction limits are utilized when the screened historical data follow a normal or transformed-normal distribution. When data cannot be normalized or the majority of data are nondetects, a nonparametric test is utilized. The distribution of data is tested using the Shapiro-Wilk/Shapiro-Francia test for normality. After testing for normality and performing any adjustments as discussed below (US EPA, 2009), data are analyzed using either parametric or non-parametric prediction limits.

- No statistical analyses are required on wells and analytes containing 100% nondetects (USEPA Unified Guidance, 2009, Chapter 6).
- When data contain <15% nondetects in background, simple substitution of one-half the reporting limit is utilized in the statistical analysis. The reporting limit

utilized for nondetects is the practical quantification limit (PQL) as reported by the laboratory.

- When data contain between 15-50% nondetects, the Kaplan-Meier nondetect adjustment is applied to the background data. This technique adjusts the mean and standard deviation of the historical concentrations to account for concentrations below the reporting limit.
- Nonparametric prediction limits are used on data containing greater than 50% nondetects.

For regulatory comparison of current observations against statistical limits, the annual site-wide false positive rate is based on the USEPA Unified Guidance (2009) recommendation of 10% (5% for each semi-annual sample event). A power curve was submitted with the background screening and demonstrated that the selected statistical method provides sufficient power to detect a change at any of the downgradient wells which complies with the USEPA Unified Guidance recommendation. The EPA suggests the selected statistical method should provide at least 55% power at 3 standard deviations or at least 80% power at 4 standard deviations.

### **Background Screening – Historical Summary (January 2019)**

#### Outlier Evaluation

During the January 2019 screening, time series plots were used to identify suspected outliers, or extreme values that would result in limits that are not conservative from a regulatory perspective, in proposed background data. Suspected outliers at all wells for Appendix III and Appendix IV parameters were formally tested using Tukey's box plot method and, when identified, may be flagged in the computer database with "o" and deselected prior to construction of statistical limits. Any flagged values are plotted in a lighter font on the time series graphs. A summary of flagged values is provided with this report (Figure C).

#### Seasonality

No seasonal patterns were observed on the time series plots for any of the detected data; therefore, no deseasonalizing adjustments were made to the data. When seasonal patterns are observed, data may be deseasonalized so that the resulting limits will correctly account for the seasonality as a predictable pattern rather than random variation or a release.

## Trends

While trends may be visually apparent, a quantification of the trend and its significance is needed for effective background screening. The Sen's Slope/Mann Kendall trend test was used to evaluate all data at each well to identify statistically significant increasing or decreasing trends. In the absence of suspected contamination, significant trending data are typically deselected and not included as part of the background data used for construction of prediction limits. This step serves to eliminate the trend and, thus, reduce variation in background. When statistically significant decreasing trends are present, earlier data are evaluated to determine whether earlier concentration levels are significantly different from current reported concentrations and are deselected as necessary. When the historical records of data are truncated to eliminate trends, a summary report will be provided to show the date ranges used in construction of the statistical limits. The results of the trend analyses were submitted with the screening report, and no records required adjustments.

## **Prediction Limit Summary**

As a result of the background screening, intrawell prediction limits were recommended for boron, fluoride and pH; while interwell prediction limits were recommended for calcium, chloride, sulfate and TDS. The 1-of-2 resample plan was recommended for both statistical method as discussed below.

All available data through September 2018 at each well were used to establish intrawell prediction limits for boron, fluoride, and pH, based on a 1-of-2 resample plan that are used for comparison against the April 2019 sample (Figure D). No statistically significant increases were noted except for fluoride in well MW-4.

Interwell prediction limits, combined with a 1-of-2 resample plan, were constructed using pooled data from upgradient wells for calcium, chloride, sulfate and TDS (Figure E). When the April 2019 samples were compared against background, the following exceedances were noted: calcium in well MW-4; chloride in wells MW-2, MW-3 and MW-4; sulfate in well MW-4; and TDS in wells MW-3 and MW-4. Complete results and summary tables for both intrawell and interwell prediction limits are included in this report.

When a prediction limit exceedance is noted, the Sen's Slope/Mann Kendall trend test is further used to evaluate concentrations and determine whether those data are increasing, decreasing or stable over time (Figure F). Upgradient wells are included in the trend tests to identify whether similar patterns exist upgradient of the facility for the same parameters which would indicate that groundwater is naturally changing. No statistically significant

increasing or decreasing trends were noted in any of the downgradient wells which indicates that data are stable over time.

Natural systems continuously evolve due to physical changes made to the environment. Examples include capping a landfill, paving areas near a well, or lining a drainage channel to prevent erosion. Periodic updating of background statistical limits will be necessary to accommodate these types of changes. In the interwell case, newer data will be included in the construction of the background limits after careful screening for new outliers or significantly trending data. In the intrawell case, data for all wells and constituents are re-evaluated when a minimum of 4 new data points are available to determine whether earlier concentrations are representative of present-day groundwater quality. In some cases, the earlier portion of data are deselected prior to construction of limits in order to provide sensitive limits that will rapidly detect changes in groundwater quality. Even though data are excluded from the calculation, the values will continue to be reported and shown in tables and graphs.

In the event of an initial exceedance by compliance well data, the 1-of-2 resample plan allows for collection of an additional sample to determine whether the initial exceedance is confirmed. When the resample confirms the initial exceedance, a statistically significant increase (SSI) is identified, and further research would be required to identify the cause of the exceedance (i.e. impact from the site, natural variation, or an off-site source). If the resample falls within the statistical limit, the initial exceedance is considered to be a false positive result and, therefore, no further action is necessary.

### Recommendations

In summary, the intrawell prediction limits identified an exceedance of fluoride in well MW-4. The interwell prediction limits identified exceedances for calcium in well MW-4; chloride in wells MW-2, MW-3 and MW-4; sulfate in well MW-4; and TDS in wells MW-3 and MW-4. The trend tests identified no statistically significant increasing trends for any of the prediction limit exceedances.

Thank you for the opportunity to assist you in the statistical analysis of groundwater quality for the Muskogee Power Plant Emergency CCR Pond. If you have any questions or comments, please feel free to contact me.

For Groundwater Stats Consulting,

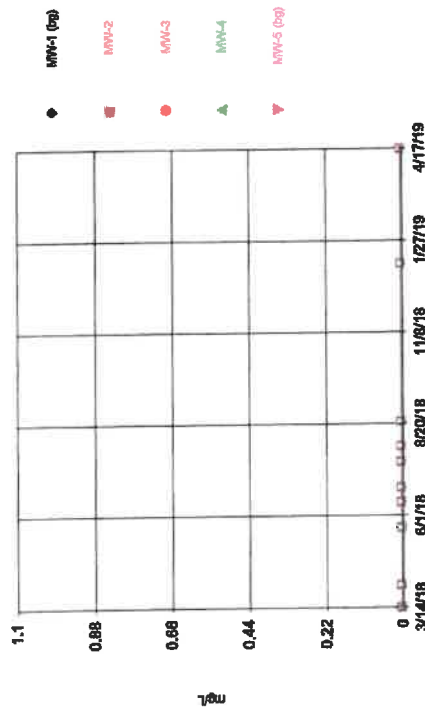
A handwritten signature in black ink that reads "Kristina Rayner". The script is cursive and fluid, with the first name and last name clearly distinguishable.

Kristina L. Rayner  
Groundwater Statistician



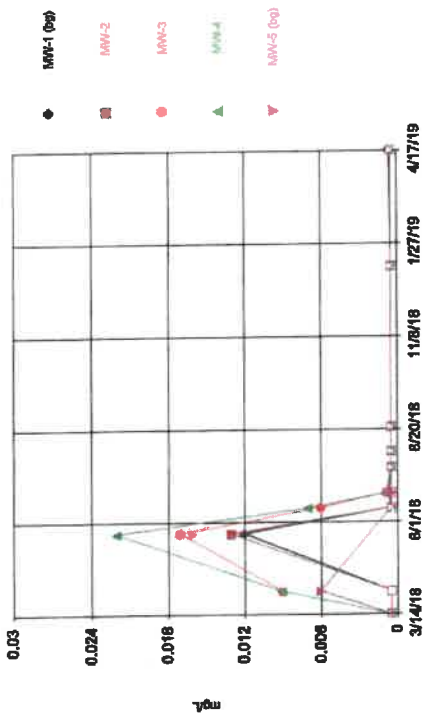
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Time Series



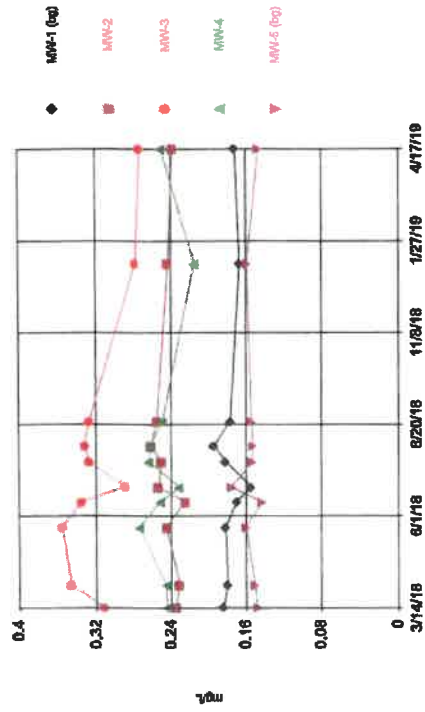
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Time Series



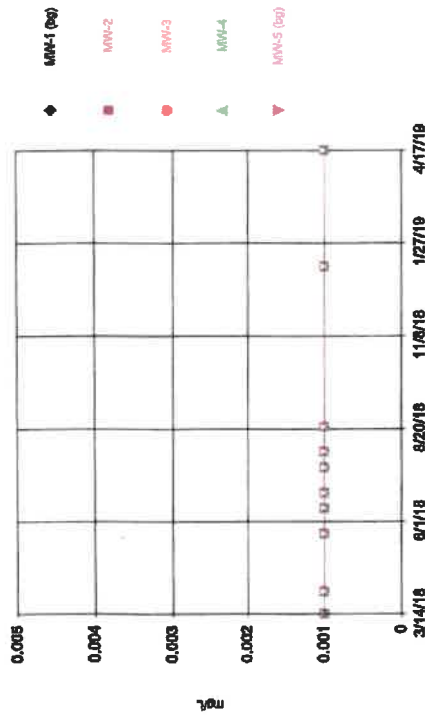
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Yellow symbols indicate censored values.

Time Series



Excel™ v.8.5.197 Series entries edited by Groundwater Site Consulting, LLC  
Yellow symbols indicate censored values.

Time Series



## Time Series

Constituent: Antimony (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.005	<0.005	<0.005	<0.005	<0.005
4/3/2018	<0.005	<0.005	<0.005	<0.005	<0.005
5/23/2018	<0.005	<0.005	<0.005	<0.005	<0.005
6/14/2018	<0.005	<0.005	<0.005	<0.005	<0.005
6/27/2018	<0.005	<0.005	<0.005	<0.005	<0.005
7/19/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/2/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/23/2018	<0.005	<0.005	<0.005	<0.005	<0.005
1/8/2019	<0.005	<0.005	<0.005	<0.005	<0.005
4/17/2019	<0.005	<0.005	<0.005	<0.005	<0.005

## Time Series

Constituent: Arsenic (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/3/2018	<0.0005	<0.0005	0.009	0.009	0.006
5/23/2018	0.012	0.013	0.017	0.022	
6/14/2018	<0.0005	<0.0005	0.006	0.007	<0.0005
6/27/2018	0.0007	<0.0005	0.0009	0.0008	0.0005
7/19/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/2/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/23/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1/8/2019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/17/2019	0.0006	<0.0005	<0.0005	<0.0005	<0.0005

## Time Series

Constituent: Barium (mg/L) Analysis Run 7/23/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	0.184	0.235	0.311	0.244	0.147
4/3/2018	0.18	0.231	0.346	0.245	0.15
5/23/2018	0.182	0.245	0.355	0.274	0.18
6/14/2018	0.17	0.225	0.335	0.251	0.142
6/27/2018	0.154	0.253	0.289	0.231	0.178
7/19/2018	0.182	0.25	0.327	0.263	0.153
8/2/2018	0.194	0.261	0.332	0.262	0.152
8/23/2018	0.177	0.255	0.327	0.249	0.154
1/8/2019	0.167	0.243	0.278	0.215	0.159
4/17/2019	0.172	0.238	0.273	0.25	0.146

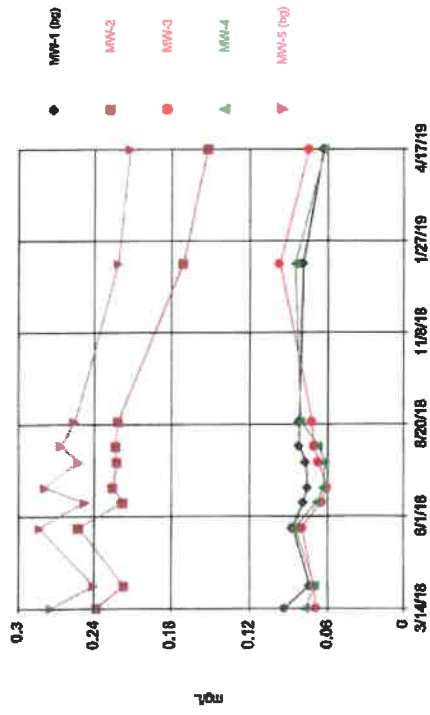
## Time Series

Constituent: Beryllium (mg/L)    Analysis Run 7/29/2019 5:32 PM    View: Descriptive  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

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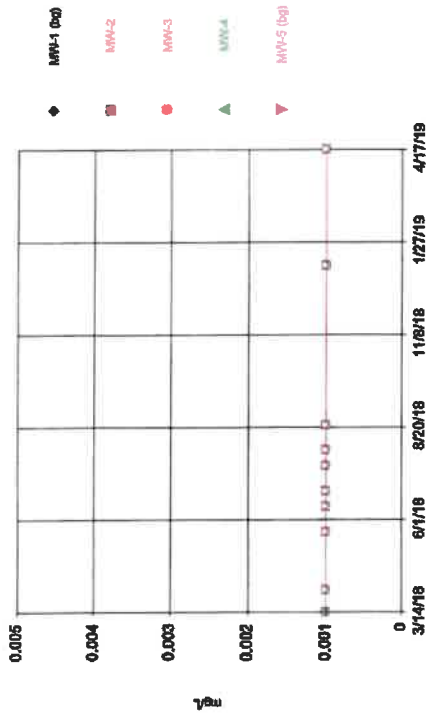
	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.001	<0.001	<0.001	<0.001	<0.001
4/3/2018	<0.001	<0.001	<0.001	<0.001	<0.001
5/23/2018	<0.001	<0.001	<0.001	<0.001	<0.001
6/14/2018	<0.001	<0.001	<0.001	<0.001	<0.001
6/27/2018	<0.001	<0.001	<0.001	<0.001	<0.001
7/19/2018	<0.001	<0.001	<0.001	<0.001	<0.001
8/2/2018	<0.001	<0.001	<0.001	<0.001	<0.001
8/23/2018	<0.001	<0.001	<0.001	<0.001	<0.001
1/8/2019	<0.001	<0.001	<0.001	<0.001	<0.001
4/17/2019	<0.001	<0.001	<0.001	<0.001	<0.001

### Time Series



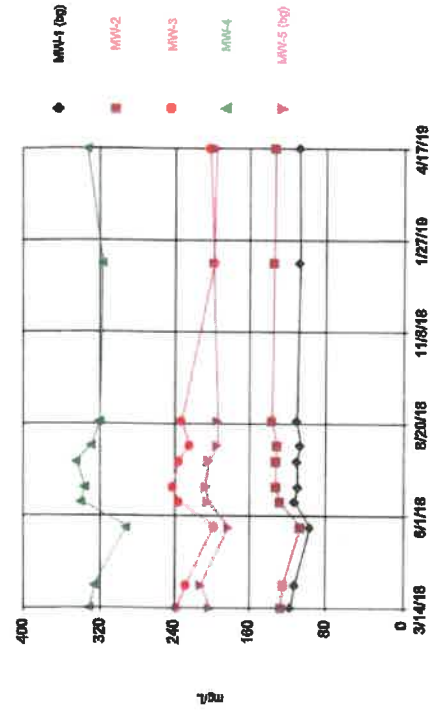
Constituent: Boron Analysis Run 7/29/2019 5:18 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Time Series



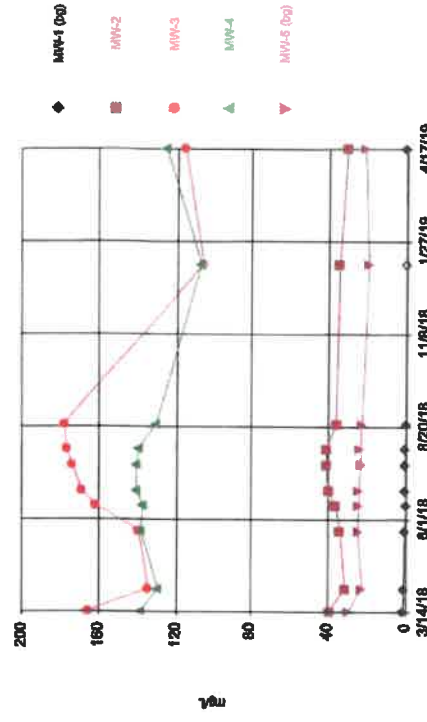
Constituent: Cadmium Analysis Run 7/29/2019 5:18 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Time Series



Constituent: Calcium Analysis Run 7/29/2019 5:18 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Time Series



Constituent: Chloride Analysis Run 7/29/2019 5:18 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant



## Time Series

Constituent: Boron (mg/L)   Analysis Run 7/29/2019 5:32 PM   View: Descriptive  
Muskogee Power Plant   Client: OGE Energy Corp.   Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	0.093	0.238	0.069	0.077	0.274
4/3/2018	0.074	0.216	0.071	0.07	0.24
5/23/2018	0.087	0.252	0.08	0.085	0.283
6/14/2018	0.079	0.217	0.065	0.068	0.247
6/27/2018	0.076	0.225	0.061	0.063	0.279
7/19/2018	0.077	0.222	0.067	0.062	0.252
8/2/2018	0.082	0.223	0.071	0.067	0.265
8/23/2018	0.082	0.221	0.072	0.081	0.255
1/8/2019	0.079	0.171	0.097	0.085	0.221
4/17/2019	0.063	0.152	0.075	0.062	0.212

## Time Series

Constituent: Cadmium (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.001	<0.001	<0.001	<0.001	<0.001
4/3/2018	<0.001	<0.001	<0.001	<0.001	<0.001
5/23/2018	<0.001	<0.001	<0.001	<0.001	<0.001
6/14/2018	<0.001	<0.001	<0.001	<0.001	<0.001
6/27/2018	<0.001	<0.001	<0.001	<0.001	<0.001
7/19/2018	<0.001	<0.001	<0.001	<0.001	<0.001
8/2/2018	<0.001	<0.001	<0.001	<0.001	<0.001
8/23/2018	<0.001	<0.001	<0.001	<0.001	<0.001
1/8/2019	<0.001	<0.001	<0.001	<0.001	<0.001
4/17/2019	<0.001	<0.001	<0.001	<0.001	<0.001

## Time Series

Constituent: Calcium (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	116	127	238	331	202
4/3/2018	112	124	228	326	212
5/23/2018	96	106	198	292	182
6/14/2018	112	128	236	340	204
6/27/2018	109	132	242	336	207
7/19/2018	110	132	236	345	203
8/2/2018	106	131	225	329	194
8/23/2018	110	136	233	320	194
1/8/2019	107	134	198	317	199
4/17/2019	108	133	203	333	196

## Time Series

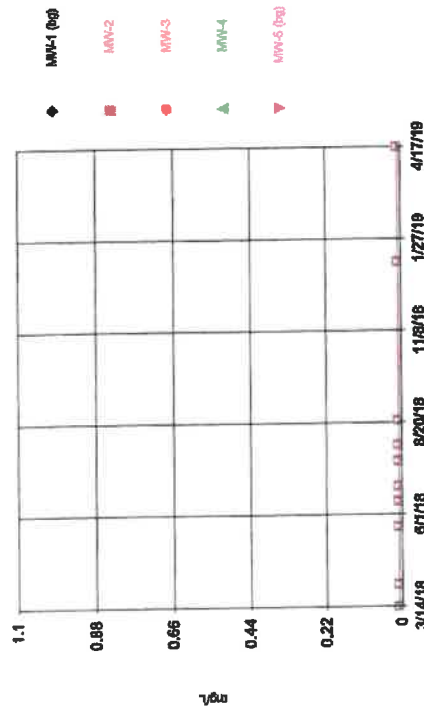
Constituent: Chloride (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	1.58	39.2	166	139	29.9
4/3/2018	1.21	31.6	135	130	23
5/23/2018	0.881	34.1	140	139	25
6/14/2018	0.0822	36.3	162	138	24.6
6/27/2018	0.715	40.1	169	141	24.6
7/19/2018	0.597	40.8	174	141	23.8
8/2/2018	0.632	41	177	140	24
8/23/2018	0.546	36.2	178	131	23.2
1/8/2019	<0.5	34.6	106	107	19.8
4/17/2019	0.675	31	116	126	21.8

RealStar™ v3.0.0.00 Software software utilized by Grandwater Data Consulting, LLC  
 Hollow symbols indicate estimated values.

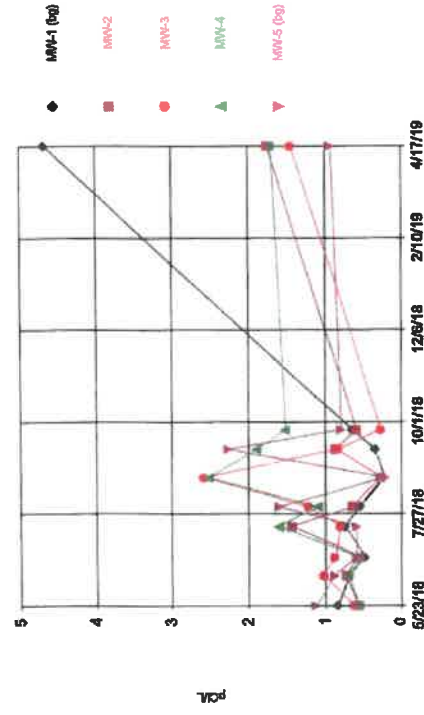
Time Series



Constituent: Chromium Analysis Run 7/29/2019 5:18 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

RealStar™ v3.0.0.00 Software software utilized by Grandwater Data Consulting, LLC

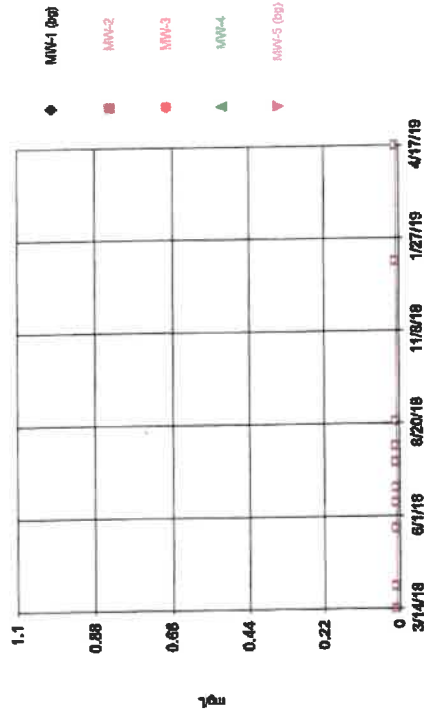
Time Series



Constituent: Chromium Analysis Run 7/29/2019 5:18 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

RealStar™ v3.0.0.00 Software software utilized by Grandwater Data Consulting, LLC  
 Hollow symbols indicate estimated values.

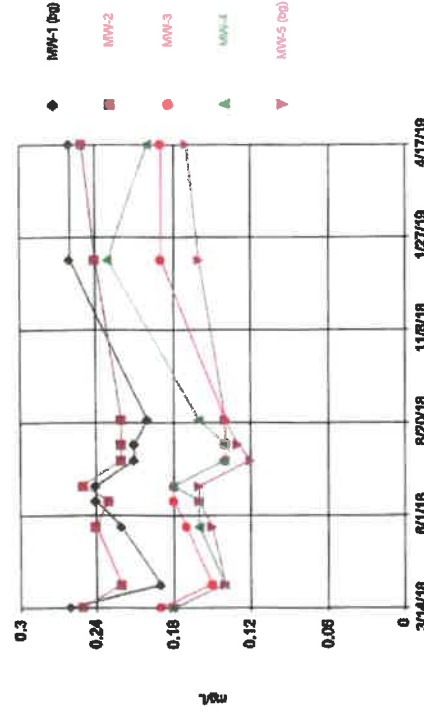
Time Series



Constituent: Cobalt Analysis Run 7/29/2019 5:18 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

RealStar™ v3.0.0.00 Software software utilized by Grandwater Data Consulting, LLC

Time Series



Constituent: Cobalt Analysis Run 7/29/2019 5:18 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

## Time Series

Constituent: Chromium (mg/L)   Analysis Run 7/29/2019 5:32 PM   View: Descriptive  
Muskogee Power Plant   Client: OGE Energy Corp.   Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.01	<0.01	<0.01	<0.01	<0.01
4/3/2018	<0.01	<0.01	<0.01	<0.01	<0.01
5/23/2018	<0.01	<0.01	<0.01	<0.01	<0.01
6/14/2018	<0.01	<0.01	<0.01	<0.01	<0.01
6/27/2018	<0.01	<0.01	<0.01	<0.01	<0.01
7/19/2018	<0.01	<0.01	<0.01	<0.01	<0.01
8/2/2018	<0.01	<0.01	<0.01	<0.01	<0.01
8/23/2018	<0.01	<0.01	<0.01	<0.01	<0.01
1/8/2019	<0.01	<0.01	<0.01	<0.01	<0.01
4/17/2019	<0.01	<0.01	<0.01	<0.01	<0.01



## Time Series

Constituent: Cobalt (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.01	<0.01	<0.01	<0.01	<0.01
4/3/2018	<0.01	<0.01	<0.01	<0.01	<0.01
5/23/2018	<0.01	<0.01	<0.01	<0.01	<0.01
6/14/2018	<0.01	<0.01	<0.01	<0.01	<0.01
6/27/2018	<0.01	<0.01	<0.01	<0.01	<0.01
7/19/2018	<0.01	<0.01	<0.01	<0.01	<0.01
8/2/2018	<0.01	<0.01	<0.01	<0.01	<0.01
8/23/2018	<0.01	<0.01	<0.01	<0.01	<0.01
1/8/2019	<0.01	<0.01	<0.01	<0.01	<0.01
4/17/2019	<0.01	<0.01	<0.01	<0.01	<0.01

## Time Series

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 7/29/2018 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
5/23/2018	0.839 (U)	0.573	0.629	0.548	1.12
6/14/2018	0.69 (U)	0.738 (U)	1.03	0.705 (U)	0.885 (U)
6/27/2018	0.477 (U)	0.553 (U)	0.878	0.59 (U)	0.594 (U)
7/19/2018	0.75 (U)	1.43	0.813 (U)	1.601	0.593 (U)
8/2/2018	0.539	0.643	1.22	1.093	1.595
8/23/2018	0.223	0.267	2.578	2.518	0.221
9/12/2018	0.343	0.868 (U)	0.837 (U)	1.887	2.263
9/26/2018	0.65	0.597 (U)	0.271	1.51	0.797
4/17/2019	4.67	1.75	1.44	1.7	0.935

## Time Series

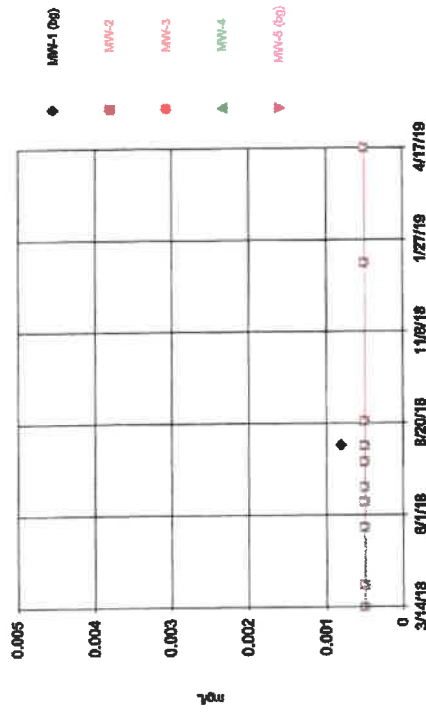
Constituent: Fluoride (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	0.26	0.25	0.19	0.18	0.18
4/3/2018	0.19	0.22	0.15	0.14	0.14
5/23/2018	0.22	0.24	0.17	0.16	0.15
6/14/2018	0.24	0.23	0.18	0.16	0.16
6/27/2018	0.24	0.25	0.18	0.18	0.16
7/19/2018	0.21	0.22	0.14	0.14	0.12
8/2/2018	0.21	0.22	0.14	0.14	0.13
8/23/2018	0.2	0.22	0.14	0.16	0.14
1/8/2019	0.26	0.24	0.19	0.23	0.16
4/17/2019	0.26	0.25	0.19	0.2	0.17

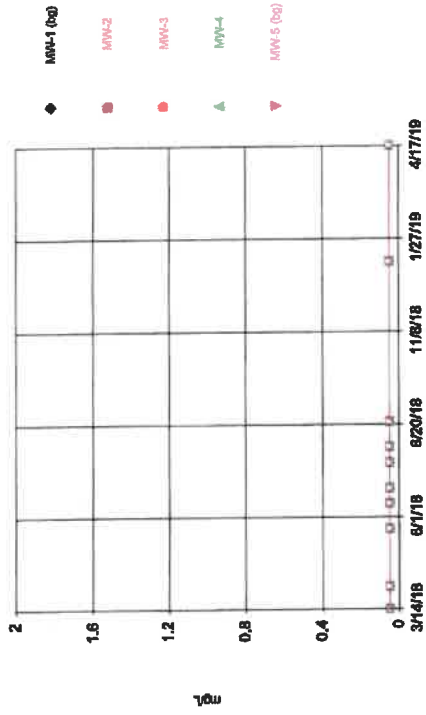
Excel® v3.2.1.17 Series software utilized by Groundwater Site Consulting, LLC  
 Hollow symbols indicate censored values.

Time Series



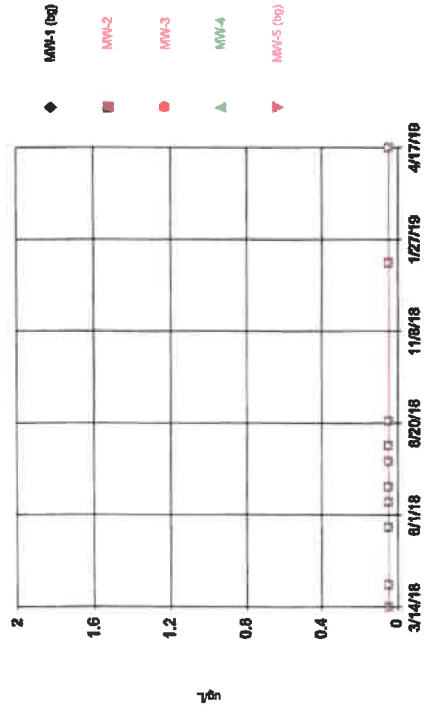
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 Hollow symbols indicate censored values.

Time Series



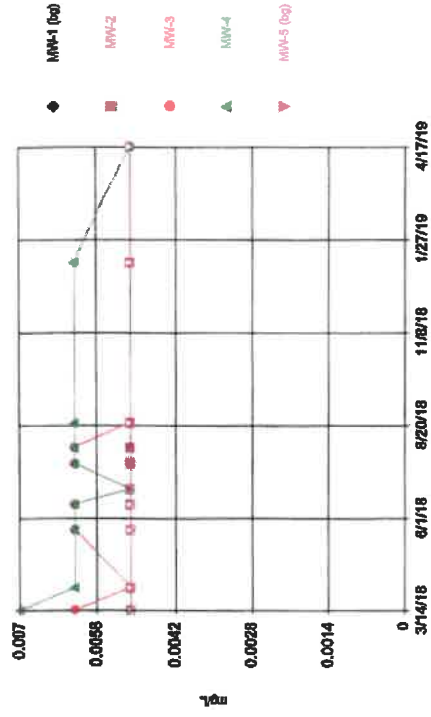
Excel® v3.2.1.17 Series software utilized by Groundwater Site Consulting, LLC  
 Hollow symbols indicate censored values.

Time Series



Excel® v3.2.1.17 Series software utilized by Groundwater Site Consulting, LLC  
 Hollow symbols indicate censored values.

Time Series



## Time Series

Constituent: Lead (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/3/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
5/23/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6/14/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6/27/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
7/19/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/2/2018		<0.0005	<0.0005	<0.0005	<0.0005
8/23/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1/8/2019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/17/2019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

## Time Series

Constituent: Lithium (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.05	<0.05	<0.05	<0.05	<0.05
4/3/2018	<0.05	<0.05	<0.05	<0.05	<0.05
5/23/2018	<0.05	<0.05	<0.05	<0.05	<0.05
6/14/2018	<0.05	<0.05	<0.05	<0.05	<0.05
6/27/2018	<0.05	<0.05	<0.05	<0.05	<0.05
7/19/2018	<0.05	<0.05	<0.05	<0.05	<0.05
8/2/2018	<0.05	<0.05	<0.05	<0.05	<0.05
8/23/2018	<0.05	<0.05	<0.05	<0.05	<0.05
1/8/2019	<0.05	<0.05	<0.05	<0.05	<0.05
4/17/2019	<0.05	<0.05	<0.05	<0.05	<0.05

## Time Series

Constituent: Mercury (ug/L)   Analysts Run 7/29/2019 5:32 PM   View: Descriptive  
Muskogee Power Plant   Client: OGE Energy Corp.   Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.05	<0.05	<0.05	<0.05	<0.05
4/3/2018	<0.05	<0.05	<0.05	<0.05	<0.05
5/23/2018	<0.05	<0.05	<0.05	<0.05	<0.05
6/14/2018	<0.05	<0.05	<0.05	<0.05	<0.05
6/27/2018	<0.05	<0.05	<0.05	<0.05	<0.05
7/19/2018	<0.05	<0.05	<0.05	<0.05	<0.05
8/2/2018	<0.05	<0.05	<0.05	<0.05	<0.05
8/23/2018	<0.05	<0.05	<0.05	<0.05	<0.05
1/8/2019	<0.05	<0.05	<0.05	<0.05	<0.05
4/17/2019	<0.05	<0.05	<0.05	<0.05	<0.05

## Time Series

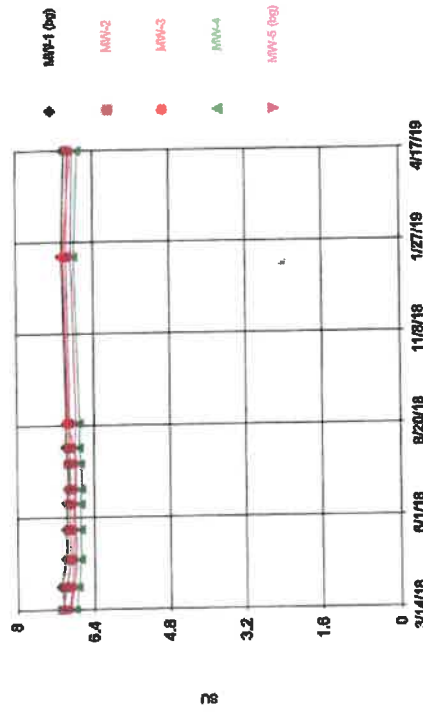
Constituent: Molybdenum (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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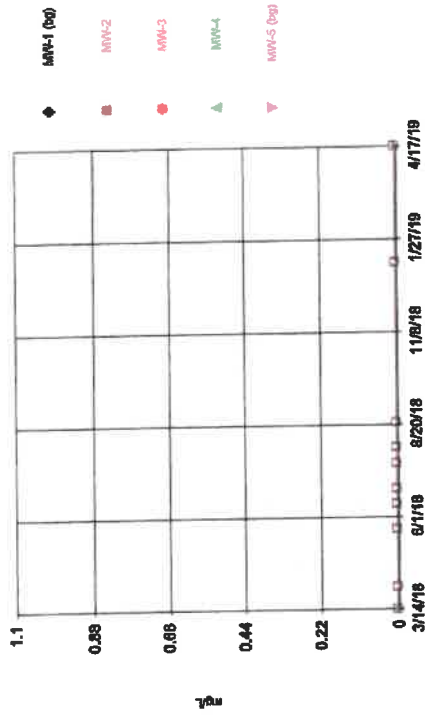
	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.005	<0.005	0.006	0.007	<0.005
4/3/2018	<0.005	<0.005	<0.005	0.006	<0.005
5/23/2018	<0.005	<0.005	0.006	0.006	<0.005
6/14/2018	<0.005	<0.005	0.006	0.006	<0.005
6/27/2018	<0.005	<0.005	<0.005	<0.005	0.005
7/19/2018	<0.005	0.005	0.006	0.006	0.005
8/2/2018	<0.005	0.005	0.006	0.006	0.005
8/23/2018	<0.005	0.005	0.005	0.006	<0.005
1/8/2019	<0.005	0.005	<0.005	0.006	<0.005
4/17/2019	<0.005	<0.005	<0.005	0.005	<0.005



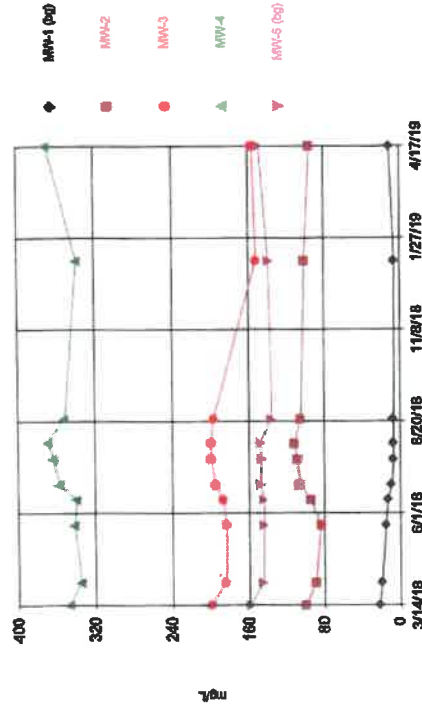
Time Series



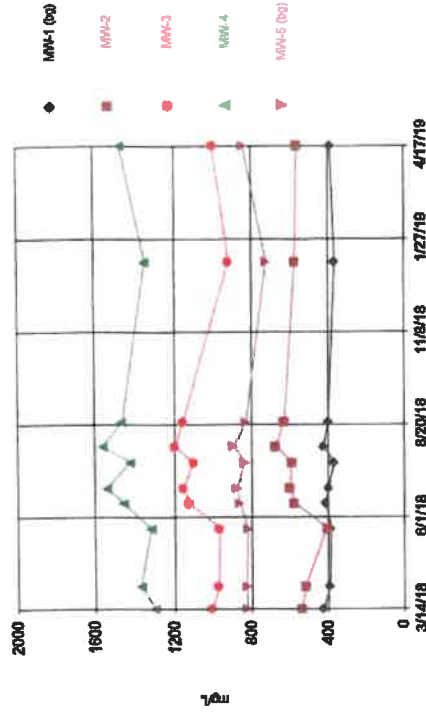
Time Series



Time Series



Time Series



## Time Series

Constituent: pH (SU) Analysis Run 7/28/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	7.03	7.07	6.93	6.79	6.91
4/3/2018	7.09	6.99	6.86	6.72	6.82
4/27/2018	6.99	6.89	6.84	6.67	6.78
5/23/2018	6.98	6.92	6.83	6.68	6.79
6/14/2018	6.97	6.9	6.82	6.68	6.8
6/27/2018	6.94	6.9	6.8	6.66	6.78
7/19/2018	6.95	6.91	6.79	6.67	6.78
8/2/2018	6.99	6.92	6.83	6.7	6.8
8/23/2018	6.97	6.91	6.95	6.69	6.78
1/15/2019	7.06	6.96	7.02	6.8	6.86
4/17/2019	7	6.93	6.88	6.71	6.82

## Time Series

Constituent: Selenium (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	<0.005	<0.005	<0.005	<0.005	<0.005
4/3/2018	<0.005	<0.005	<0.005	<0.005	<0.005
5/23/2018	<0.005	<0.005	<0.005	<0.005	<0.005
6/14/2018	<0.005	<0.005	<0.005	<0.005	<0.005
6/27/2018	<0.005	<0.005	<0.005	<0.005	<0.005
7/19/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/2/2018	<0.005	<0.005	<0.005	<0.005	<0.005
8/23/2018	<0.005	<0.005	<0.005	<0.005	<0.005
1/8/2019	<0.005	<0.005	<0.005	<0.005	<0.005
4/17/2019	<0.005	<0.005	<0.005	<0.005	<0.005

## Time Series

Constituent: Sulfate (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	22	99.3	200	347	159
4/3/2018	19.7	88.7	185	336	145
5/23/2018	14.9	83.4	184	341	144
6/14/2018	12.8	94.5	188	339	144
8/27/2018	8.98	106	196	357	148
7/19/2018	7.13	109	200	363	147
8/2/2018	6.9	112	200	368	148
8/23/2018	6.82	105	198	351	136
1/8/2019	6.07	101	152	338	139
4/17/2019	10.8	94.8	156	369	149

## Time Series

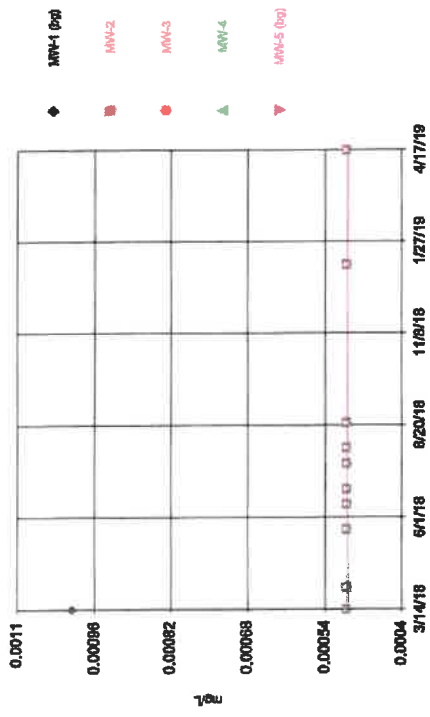
Constituent: TDS (mg/L)    Analysis Run 7/29/2019 5:32 PM    View: Descriptive  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

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	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018	424	544	1010	1300	826
4/3/2018	392	522	976	1370	830
5/23/2018	386	406	970	1320	824
6/14/2018	413	580	1127	1454	867
6/27/2018	357	603	1155	1535	877
7/19/2018	369	595	1102	1420	839
8/2/2018	425	675	1199	1557	894
8/23/2018	400	631	1156	1480	831
1/8/2019	365	578	920	1346	723
4/17/2019	388	568	1002	1465	844

Notes: \*EPA SF Series software utilized by Greenpeace Data Consulting, LLC  
Follow symbols indicates corrected values.

Time Series



Constituent: Thallium Analysis Run: 7/29/2019 5:18 PM View: Descriptive  
Muskegon Power Plant Client: OGE Energy Corp. Data: Muskegon Power Plant

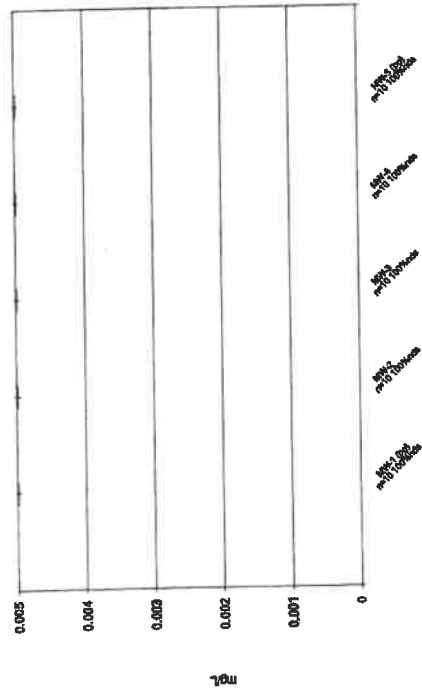
## Time Series

Constituent: Thallium (mg/L) Analysis Run 7/29/2019 5:32 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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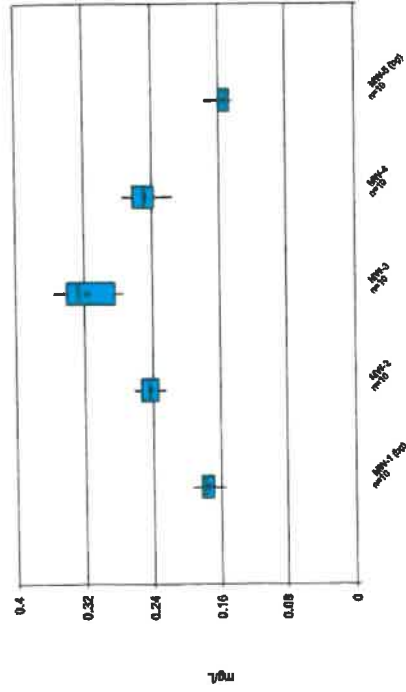
	MW-1 (bg)	MW-2	MW-3	MW-4	MW-5 (bg)
3/14/2018		<0.0005	<0.0005	<0.0005	<0.0005
4/3/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
5/23/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6/14/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
6/27/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
7/19/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/2/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
8/23/2018	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1/8/2019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
4/17/2019	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005

### Box & Whiskers Plot



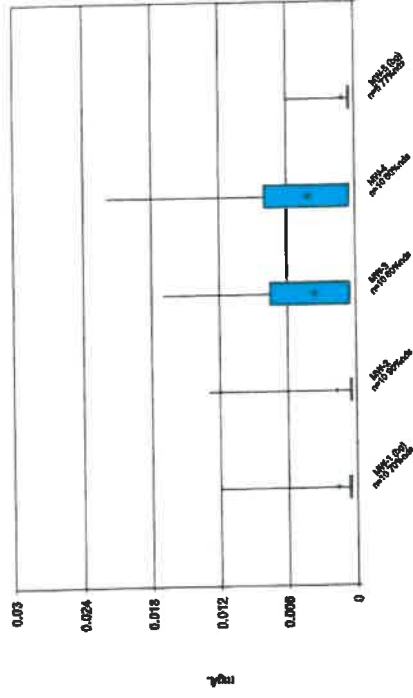
Constituent: Barium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Mustangee Power Plant Client: OGE Energy Corp. Data: Mustangee Power Plant

### Box & Whiskers Plot



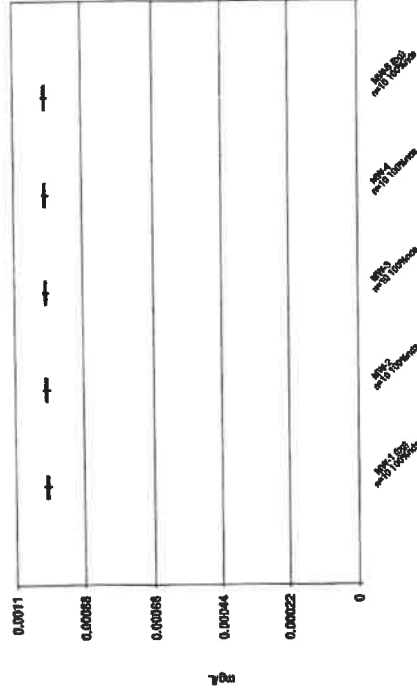
Constituent: Barium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Mustangee Power Plant Client: OGE Energy Corp. Data: Mustangee Power Plant

### Box & Whiskers Plot



Constituent: Barium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Mustangee Power Plant Client: OGE Energy Corp. Data: Mustangee Power Plant

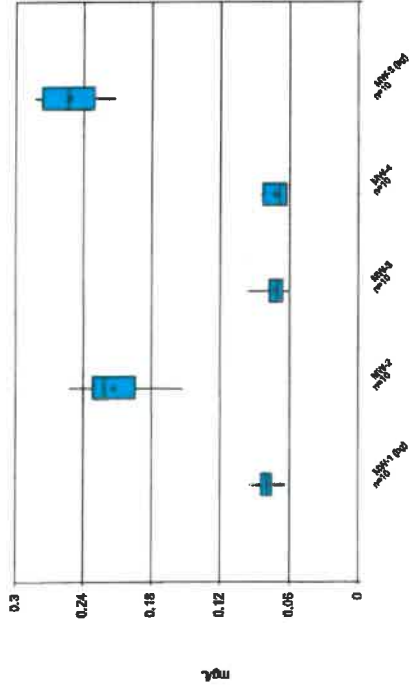
### Box & Whiskers Plot



Constituent: Barium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Mustangee Power Plant Client: OGE Energy Corp. Data: Mustangee Power Plant

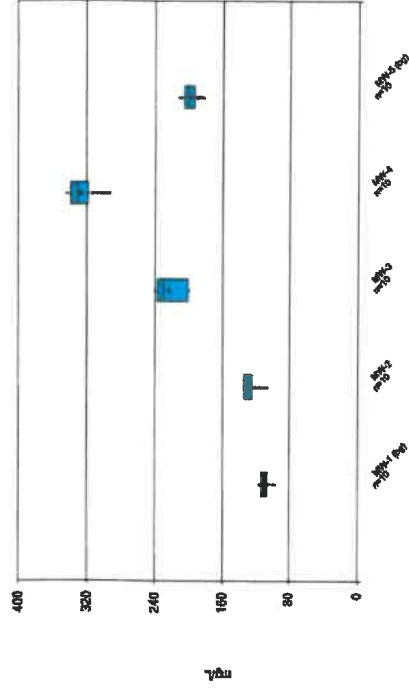


### Box & Whiskers Plot



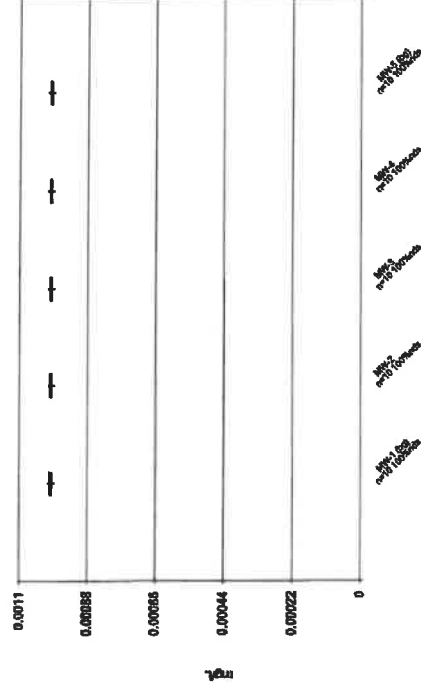
Constituent: Boron Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



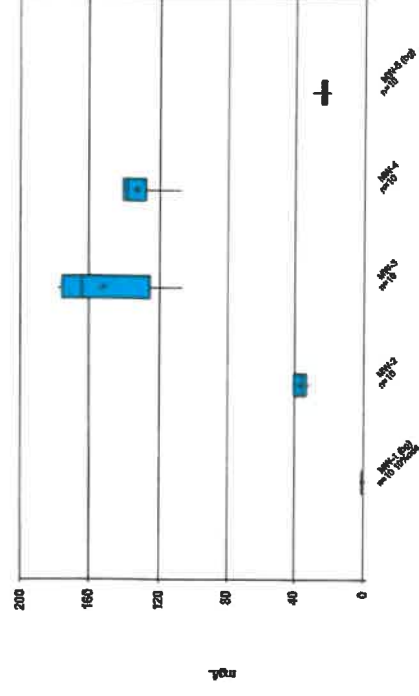
Constituent: Calcium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



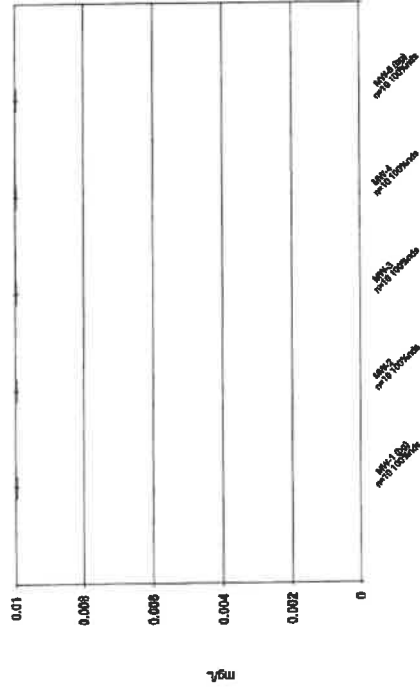
Constituent: Cadmium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



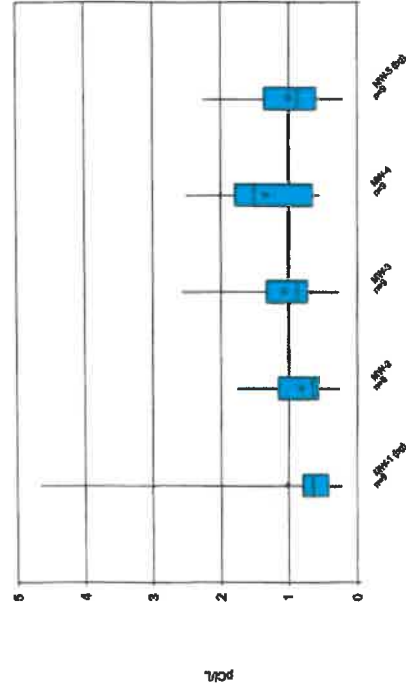
Constituent: Chloride Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Box & Whiskers Plot



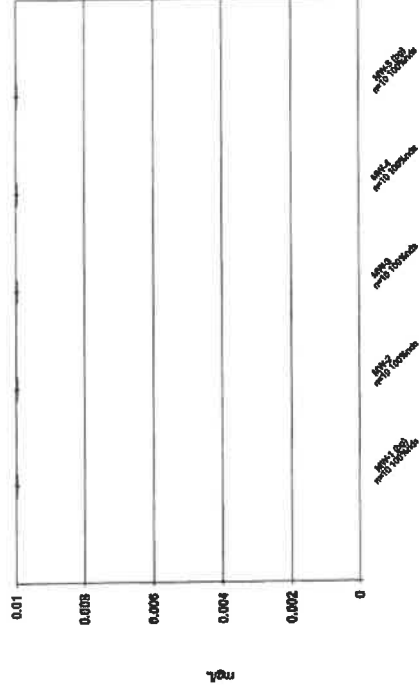
Constituent: Chromium Analysis Run 7/28/2019 8:22 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Box & Whiskers Plot



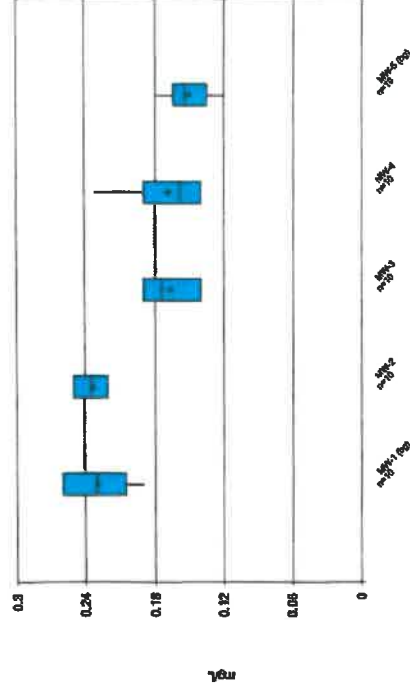
Constituent: Combined Radium 226 + 228 Analysis Run 7/28/2019 8:22 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Box & Whiskers Plot



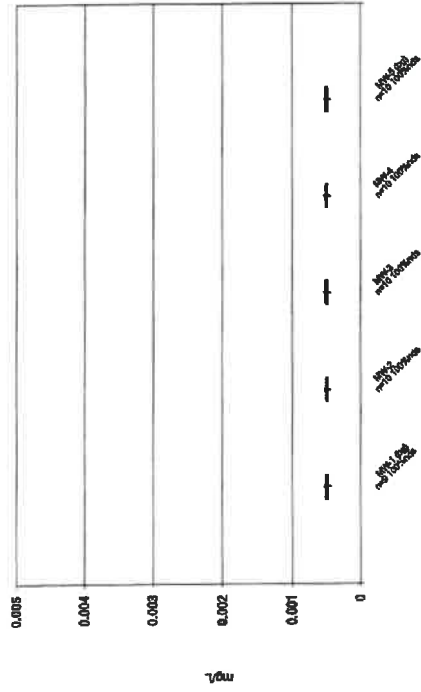
Constituent: Cobalt Analysis Run 7/29/2019 8:22 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Box & Whiskers Plot

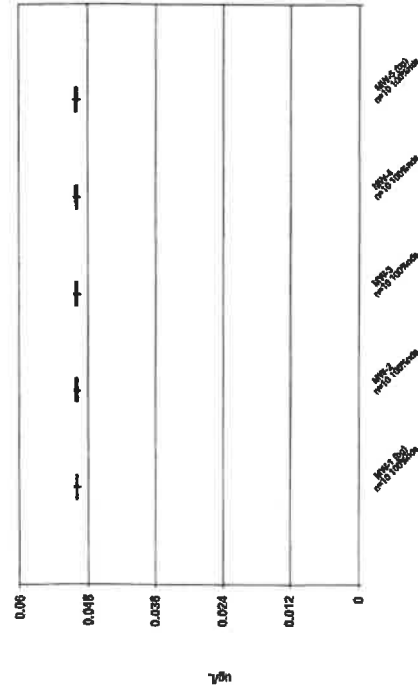


Constituent: Fluoride Analysis Run 7/29/2019 8:22 PM View: Descriptive  
 Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

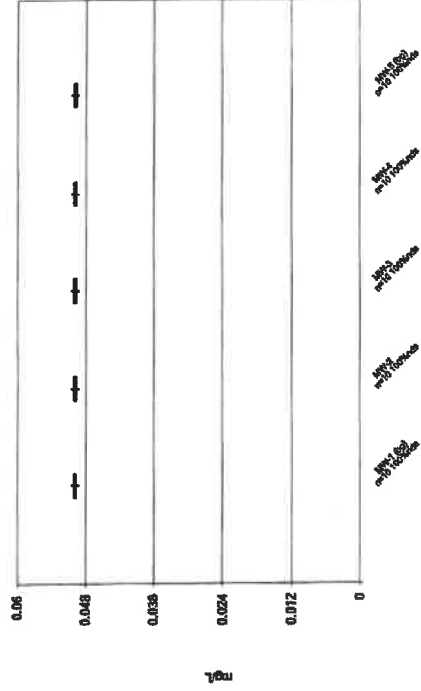
### Box & Whiskers Plot



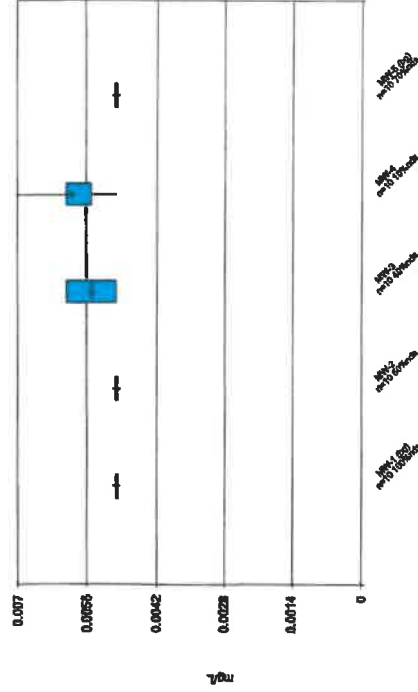
### Box & Whiskers Plot



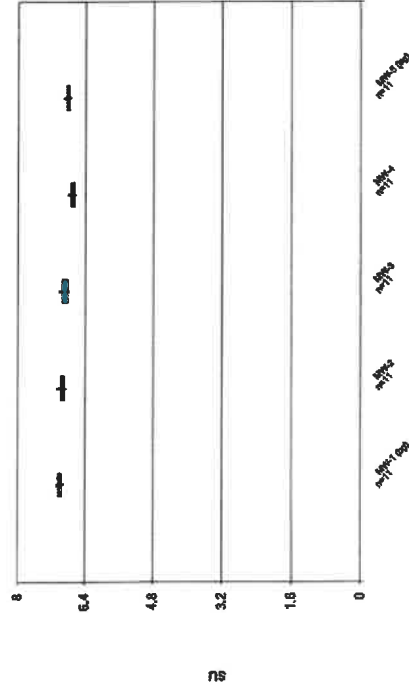
### Box & Whiskers Plot



### Box & Whiskers Plot

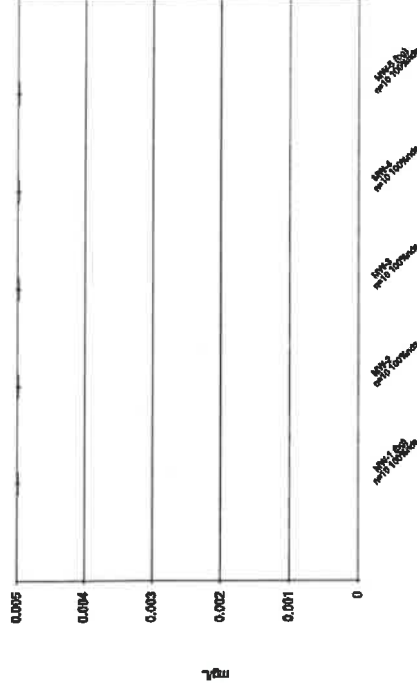


### Box & Whiskers Plot



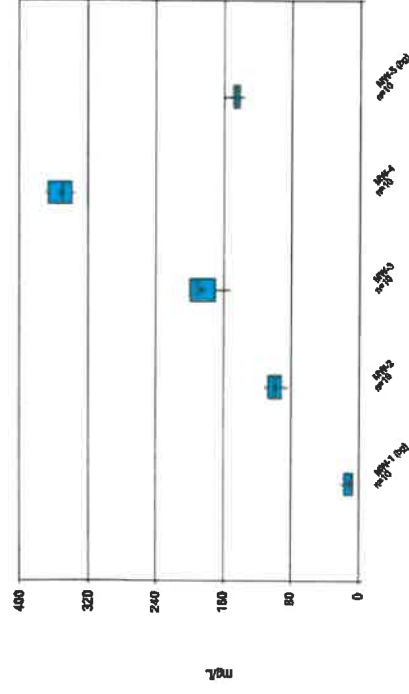
Constituent: pH Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



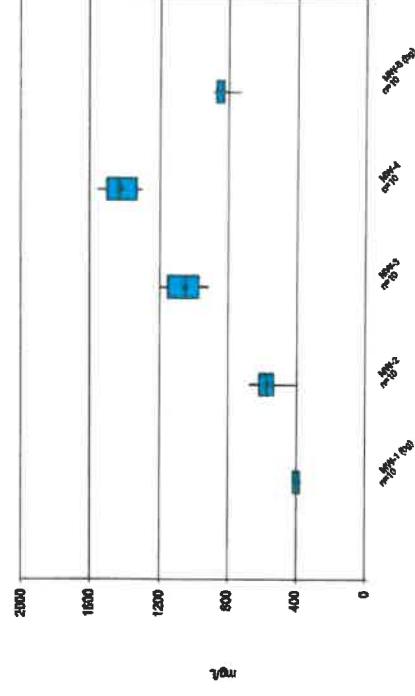
Constituent: Selenum Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



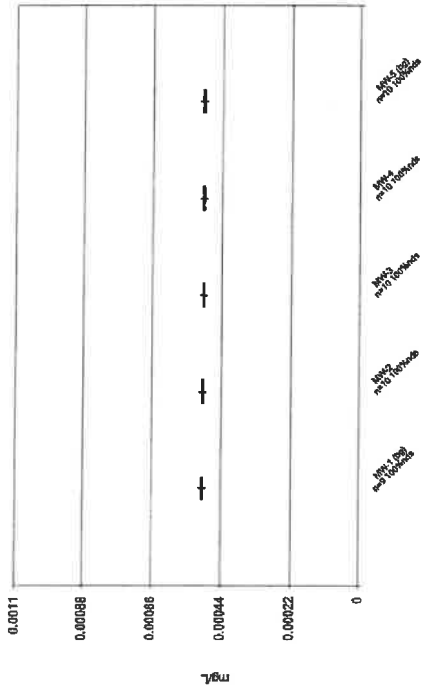
Constituent: Sulfate Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



Constituent: TDS Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Box & Whiskers Plot



Constituent: Thallium Analysis Run 7/29/2019 8:22 PM View: Descriptive  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

## Outlier Summary

Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant Printed 7/28/2019, 5:33 PM

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	MW-5 Arsenic (mg/L)	MW-1 Lead (mg/L)	MW-1 Thallium (mg/L)
3/14/2018			0.001 (o)
5/23/2018	0.016 (o)		
8/2/2018		0.0008 (o)	

# Intrawell Prediction Limit Summary - Significant Results

Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant Printed 7/29/2019, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sta.	Bg	N	Bg Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Fluoride (mg/L)	MW-4	0.1985	n/a	4/17/2019	0.2	Yes	8	0.1675	0.01669	0	None	No	0.002506	Param Intra	1 of 2

# Intrawell Prediction Limit Summary - All Results

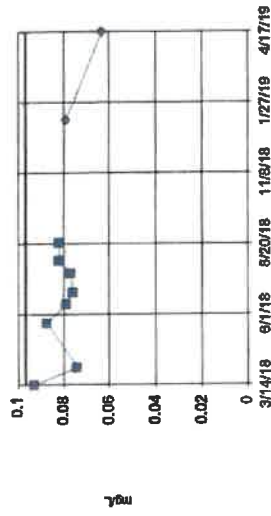
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant Printed 7/29/2019, 5:05 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sta.	Bq/L	Bq Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Boron (mg/L)	MW-1	0.09667	n/a	4/17/2019	0.063	No	8	0.08125	0.006274	0	None	No	0.002505	Param Intra 1 of 2
Boron (mg/L)	MW-2	0.2588	n/a	4/17/2019	0.152	No	8	0.2258	0.01223	0	None	No	0.002505	Param Intra 1 of 2
Boron (mg/L)	MW-3	0.08328	n/a	4/17/2019	0.075	No	8	0.0695	0.005606	0	None	No	0.002505	Param Intra 1 of 2
Boron (mg/L)	MW-4	0.0924	n/a	4/17/2019	0.062	No	8	0.07163	0.00845	0	None	No	0.002505	Param Intra 1 of 2
Boron (mg/L)	MW-5	0.3006	n/a	4/17/2019	0.212	No	8	0.2619	0.01577	0	None	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-1	0.2792	n/a	4/17/2019	0.26	No	8	0.2213	0.02357	0	None	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-2	0.2646	n/a	4/17/2019	0.25	No	8	0.2313	0.01356	0	None	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-3	0.2129	n/a	4/17/2019	0.19	No	8	0.1613	0.021	0	None	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-4	0.1985	n/a	4/17/2019	0.2	Yes	8	0.1575	0.01689	0	None	No	0.002505	Param Intra 1 of 2
Fluoride (mg/L)	MW-5	0.1944	n/a	4/17/2019	0.17	No	8	0.1475	0.01909	0	None	No	0.002505	Param Intra 1 of 2
pH (SU)	MW-1	7.097	6.883	4/17/2019	7	No	9	6.99	0.04555	0	None	No	0.001253	Param Intra 1 of 2
pH (SU)	MW-2	7.07	6.89	4/17/2019	6.83	No	9	n/a	n/a	0	n/a	n/a	0.03619	NP Intra (normality) 1 of 2
pH (SU)	MW-3	6.88	6.72	4/17/2019	6.88	No	9	6.85	0.05523	0	None	No	0.001253	Param Intra 1 of 2
pH (SU)	MW-4	6.789	6.602	4/17/2019	6.71	No	9	6.698	0.03972	0	None	No	0.001253	Param Intra 1 of 2
pH (SU)	MW-5	6.91	6.78	4/17/2019	6.82	No	9	n/a	n/a	0	n/a	n/a	0.03619	NP Intra (normality) 1 of 2



Within Limit

Prediction Limit  
Intrawell Parametric



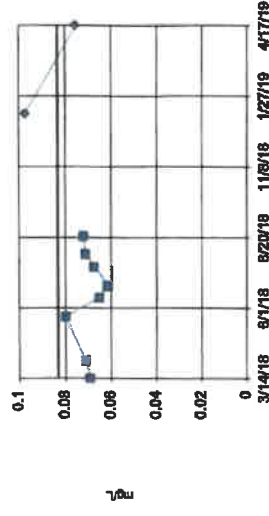
Limit = 0.09597

Background Data Summary: Mean=0.08125, Std. Dev.=0.006274, n=3. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9314, critical = 0.748. Kappa = 2.458 (n=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Boron Analysis Run 7/29/2019 5:00 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric



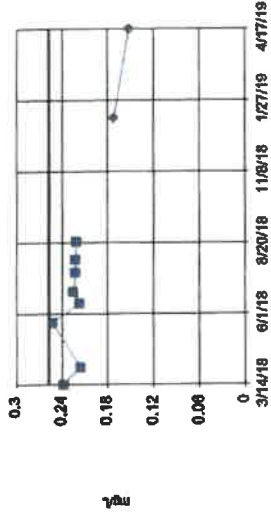
Limit = 0.09528

Background Data Summary: Mean=0.08925, Std. Dev.=0.005603, n=3. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9597, critical = 0.748. Kappa = 2.458 (n=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Boron Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric



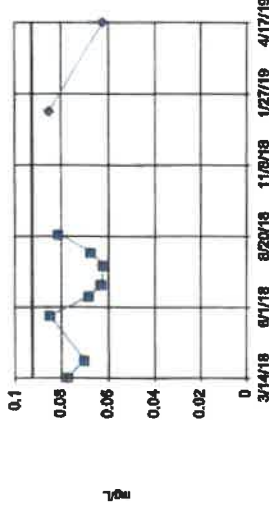
Limit = 0.2588

Background Data Summary: Mean=0.2288, Std. Dev.=0.01223, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8131, critical = 0.748. Kappa = 2.458 (n=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Boron Analysis Run 7/29/2019 5:00 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric



Limit = 0.0924

Background Data Summary: Mean=0.07183, Std. Dev.=0.00945, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9222, critical = 0.748. Kappa = 2.458 (n=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Boron Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

## Prediction Limit

Constituent: Boron (mg/L)   Analysis Run 7/29/2019 5:06 PM   View: PL's Intrawell  
Muskogee Power Plant   Client: OGE Energy Corp.   Data: Muskogee Power Plant

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	MW-1	MW-1
3/14/2018	0.093	
4/3/2018	0.074	
5/23/2018	0.087	
6/14/2018	0.079	
6/27/2018	0.076	
7/19/2018	0.077	
8/2/2018	0.082	
8/23/2018	0.082	
1/8/2019		0.079
4/17/2019		0.063

## Prediction Limit

Constituent: Boron (mg/L) Analysis Run 7/29/2018 5:08 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-2	MW-2
3/14/2018	0.238	
4/3/2018	0.216	
5/23/2018	0.252	
6/14/2018	0.217	
6/27/2018	0.225	
7/19/2018	0.222	
8/2/2018	0.223	
8/23/2018	0.221	
1/8/2019		0.171
4/17/2019		0.152

## Prediction Limit

Constituent: Boron (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-3	MW-3
3/14/2018	0.069	
4/3/2018	0.071	
5/23/2018	0.08	
6/14/2018	0.065	
6/27/2018	0.061	
7/19/2018	0.067	
8/2/2018	0.071	
8/23/2018	0.072	
1/8/2019		0.097
4/17/2019		0.075

## Prediction Limit

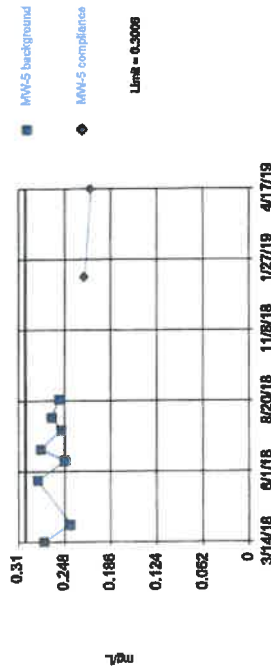
Constituent: Boron (mg/L)    Analysis Run 7/29/2019 5:06 PM    View: PL's Intrawell  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

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	MW-4	MW-4
3/14/2018	0.077	
4/3/2018	0.07	
5/23/2018	0.085	
6/14/2018	0.068	
6/27/2018	0.063	
7/19/2018	0.062	
8/2/2018	0.067	
8/23/2018	0.081	
1/8/2019		0.085
4/17/2019		0.062

Within Limit

Prediction Limit  
Intrawell Parametric

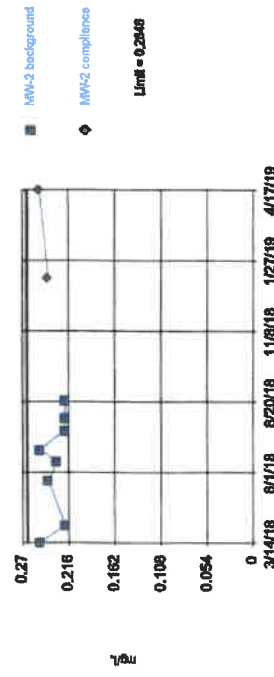


Background Data Summary: Mean=0.2810, Std. Dev.=0.01577, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9442, critical = 0.7483. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Boron Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric

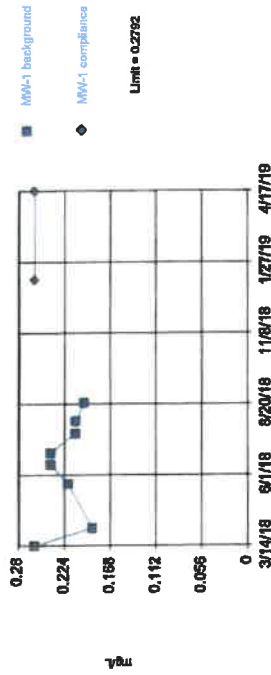


Background Data Summary: Mean=0.2313, Std. Dev.=0.01358, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7803, critical = 0.7483. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Fluoride Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric

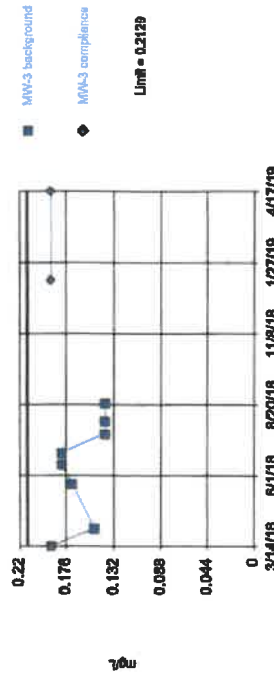


Background Data Summary: Mean=0.2213, Std. Dev.=0.02357, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9512, critical = 0.7483. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Fluoride Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=0.1813, Std. Dev.=0.021, n=8. Insufficient data to test for seasonality: data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8429, critical = 0.7483. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Fluoride Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

## Prediction Limit

Constituent: Boron (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-5	MW-5
3/14/2018	0.274	
4/3/2018	0.24	
5/23/2018	0.283	
6/14/2018	0.247	
6/27/2018	0.278	
7/19/2018	0.252	
8/2/2018	0.265	
8/23/2018	0.255	
1/8/2019		0.221
4/17/2019		0.212

## Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1	MW-1
3/14/2018	0.26	
4/3/2018	0.19	
5/23/2018	0.22	
6/14/2018	0.24	
6/27/2018	0.24	
7/19/2018	0.21	
8/2/2018	0.21	
8/23/2018	0.2	
1/9/2019		0.25
4/17/2019		0.26



## Prediction Limit

Constituent: Fluoride (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-2	MW-2
3/14/2018	0.25	
4/3/2018	0.22	
5/23/2018	0.24	
6/14/2018	0.23	
6/27/2018	0.25	
7/19/2018	0.22	
8/2/2018	0.22	
8/23/2018	0.22	
1/8/2019		0.24
4/17/2019		0.25

## Prediction Limit

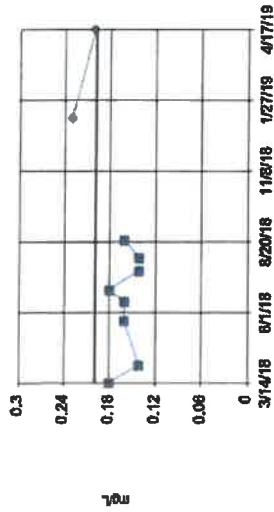
Constituent: Fluoride (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-3	MW-3
3/14/2018	0.19	
4/3/2018	0.15	
5/23/2018	0.17	
6/14/2018	0.18	
6/27/2018	0.18	
7/19/2018	0.14	
8/2/2018	0.14	
8/23/2018	0.14	
1/8/2019		0.19
4/17/2019		0.19

Exceeds Limit

Prediction Limit  
Intrawell Parametric

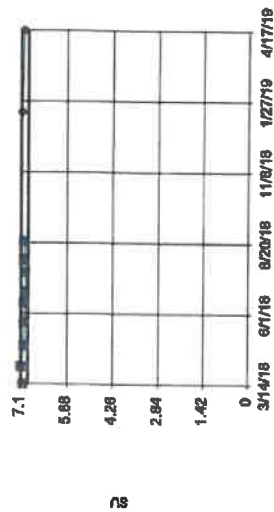


Background Data Summary: Mean=0.1575, Std. Dev.=0.01669, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8349, critical = 0.740. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Fluoride Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limits

Prediction Limit  
Intrawell Parametric

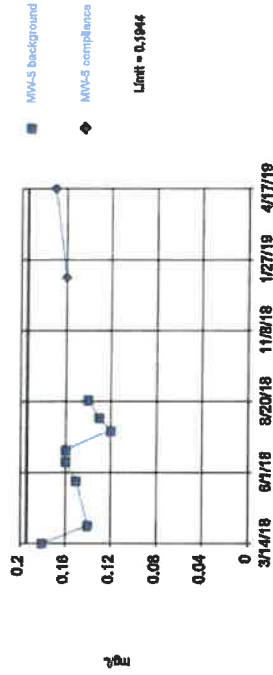


Background Data Summary: Mean=6.99, Std. Dev.=0.04565, n=9. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8692, critical = 0.764. Kappa = 2.548 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limit

Prediction Limit  
Intrawell Parametric

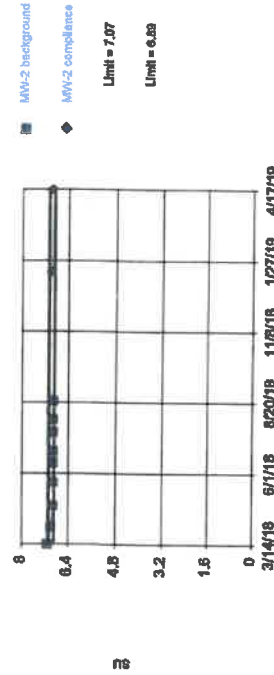


Background Data Summary: Mean=0.1475, Std. Dev.=0.01908, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.9746, critical = 0.748. Kappa = 2.458 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: Fluoride Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limits

Prediction Limit  
Intrawell Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest for worst of 8 background values. Worst-constituent pair annual alpha = 0.07172. Individual comparison alpha = 0.09319 (1 of 2). Insufficient data to test for seasonality; data were not deseasonalized.

Constituent: pH Analysis Run 7/29/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

## Prediction Limit.

Constituent: Fluoride (mg/L) Analysis Run 7/29/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-4	MW-4
3/14/2018	0.18	
4/3/2018	0.14	
5/23/2018	0.16	
6/14/2018	0.16	
6/27/2018	0.18	
7/19/2018	0.14	
8/2/2018	0.14	
8/23/2018	0.16	
1/8/2019		0.23
4/17/2019		0.2

## Prediction Limit

Constituent: Fluoride (mg/L)    Analysis Run 7/29/2019 5:08 PM    View: PL's Intrawell  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

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	MW-5	MW-5
3/14/2018	0.18	
4/3/2018	0.14	
5/23/2018	0.15	
6/14/2018	0.16	
6/27/2018	0.16	
7/19/2018	0.12	
8/2/2018	0.13	
8/23/2018	0.14	
1/8/2019		0.16
4/17/2019		0.17

## Prediction Limit

Constituent: pH (SU) Analysis Run 7/29/2019 5:06 PM View: PL's IntraWell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1	MW-1
3/14/2018	7.03	
4/3/2018	7.08	
4/27/2018	6.99	
5/23/2018	6.98	
6/14/2018	6.97	
6/27/2018	6.94	
7/19/2018	6.95	
8/2/2018	6.99	
8/23/2018	6.97	
1/15/2019		7.06
4/17/2019		7

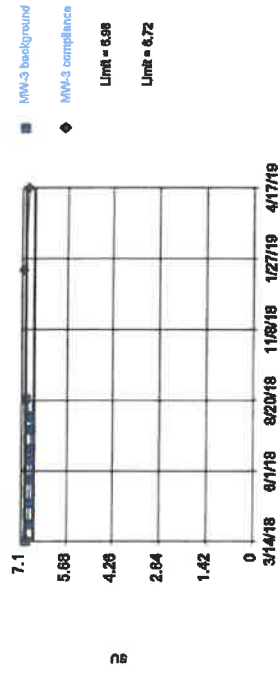
## Prediction Limit

Constituent: pH (SU) Analysis Run 7/29/2019 5:06 PM View: PL's IntraWell  
Muskogee Power Plant Client: OGE Energy Corp. Date: Muskogee Power Plant

	MW-2	MW-2
3/14/2018	7.07	
4/3/2018	6.99	
4/27/2018	6.89	
5/23/2018	6.92	
6/14/2018	6.9	
6/27/2018	6.9	
7/19/2018	6.91	
8/2/2018	6.92	
8/23/2018	6.91	
1/15/2019		6.96
4/17/2019		6.93

Within Limits

Prediction Limit  
Intrawell Parametric

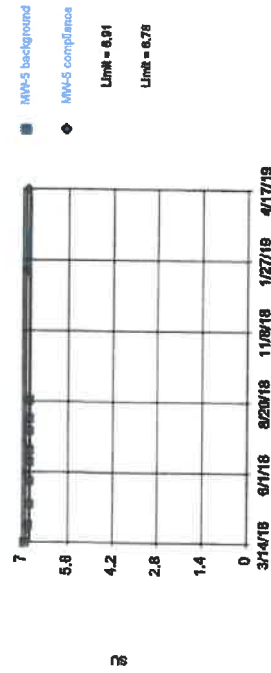


Background Data Summary: Mean=6.88, Std. Dev.=0.05521, n=9. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.8844, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH Analysis Run 7/28/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limits

Prediction Limit  
Intrawell Non-parametric

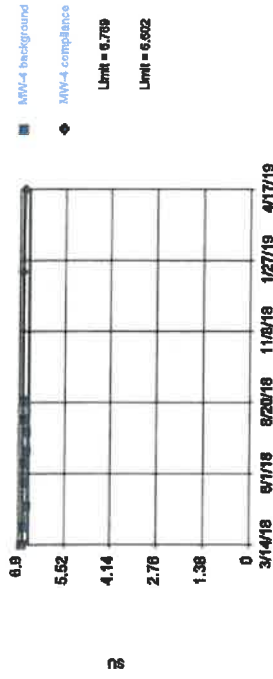


Non-parametric test used in lieu of parametric; prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limits are highest and lowest of 9 background values. Well-constituent pair annual alpha = 0.07172. Individual comparison alpha = 0.03819 (1 of 2). Insufficient data to test for seasonality; data were not deseasonalized.

Constituent: pH Analysis Run 7/28/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

Within Limits

Prediction Limit  
Intrawell Parametric



Background Data Summary: Mean=6.688, Std. Dev.=0.03972, n=8. Insufficient data to test for seasonality; data were not deseasonalized. Normality test: Shapiro Wilk @alpha = 0.01, calculated = 0.7885, critical = 0.764. Kappa = 2.348 (c=7, w=3, 1 of 2, event alpha = 0.05132). Report alpha = 0.002505.

Constituent: pH Analysis Run 7/28/2019 5:01 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant



## Prediction Limit

Constituent: pH (SU) Analysis Run 7/28/2019 5:06 PM View: PL's Intrawell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

	MW-3	MW-3
3/14/2018	6.93	
4/3/2018	6.86	
4/27/2018	6.84	
5/23/2018	6.83	
6/14/2018	6.82	
6/27/2018	6.8	
7/19/2018	6.79	
8/2/2018	6.83	
8/23/2018	6.95	
1/15/2019		7.02
4/17/2019		6.88

Prediction Limit

Constituent: pH (SU)    Analysis Run 7/29/2019 5:06 PM    View: PL's Inflow  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

	MW-4	MW-4
3/14/2018	6.79	
4/3/2018	6.72	
4/27/2018	6.67	
5/23/2018	6.68	
6/14/2018	6.68	
6/27/2018	6.68	
7/19/2018	6.67	
8/2/2018	6.7	
8/23/2018	5.69	
1/15/2019		6.8
4/17/2019		6.71

Prediction Limit

Constituent: pH (SU)    Analysis Run 7/29/2019 5:06 PM    View: PL's IntraWell  
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant

	MW-5	MW-5
3/14/2018	6.91	
4/3/2018	6.82	
4/27/2018	6.78	
5/23/2018	6.79	
6/14/2018	6.8	
6/27/2018	6.78	
7/19/2018	6.78	
8/2/2018	6.8	
8/23/2018	6.78	
1/15/2019		6.86
4/17/2019		6.82

## Interwell Prediction Limit Summary - Significant Results

Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant Printed 7/29/2019, 5:08 PM

Constituent	Well	Upper Lim.	Lower Lim.	Date	Observ.	Sig.	Bq N	Bq Mean	Std. Dev.	%NDs	ND Adj.	Transform	Alpha	Method
Calcium (mg/L)	MW-4	212	n/a	4/17/2019	333	Yes	20	n/a	n/a	0	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-2	29.9	n/a	4/17/2019	31	Yes	20	n/a	n/a	5	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-3	29.9	n/a	4/17/2019	116	Yes	20	n/a	n/a	5	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4	29.9	n/a	4/17/2019	126	Yes	20	n/a	n/a	5	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4	159	n/a	4/17/2019	359	Yes	20	n/a	n/a	0	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
TDS (mg/L)	MW-3	894	n/a	4/17/2019	1002	Yes	20	n/a	n/a	0	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
TDS (mg/L)	MW-4	894	n/a	4/17/2019	1465	Yes	20	n/a	n/a	0	n/a	n/a	0.004138	NP Inter (normality) 1 of 2

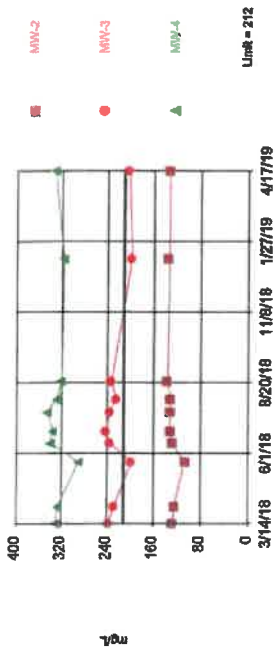
## Interwell Prediction Limit Summary - All Results

Muskogee Power Plant    Client: OGE Energy Corp.    Date: Muskogee Power Plant    Printed 7/29/2019, 5:08 PM

<u>Constituent</u>	<u>Well</u>	<u>Upper Lim.</u>	<u>Lower Lim.</u>	<u>Date</u>	<u>Observ.</u>	<u>Sig.</u>	<u>Bq</u>	<u>N Bq</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>%NDs</u>	<u>ND Adj.</u>	<u>Transform</u>	<u>Alpha</u>	<u>Method</u>
Calcium (mg/L)	MW-2	212	n/a	4/17/2019	133	No	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-3	212	n/a	4/17/2019	203	No	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Calcium (mg/L)	MW-4	212	n/a	4/17/2019	333	Yes	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-2	29.9	n/a	4/17/2019	31	Yes	20	n/a	n/a	5	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-3	29.9	n/a	4/17/2019	116	Yes	20	n/a	n/a	5	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Chloride (mg/L)	MW-4	29.9	n/a	4/17/2019	128	Yes	20	n/a	n/a	5	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-2	159	n/a	4/17/2019	94.8	No	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-3	159	n/a	4/17/2019	166	No	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
Sulfate (mg/L)	MW-4	159	n/a	4/17/2019	368	Yes	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
TDS (mg/L)	MW-2	894	n/a	4/17/2019	568	No	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
TDS (mg/L)	MW-3	894	n/a	4/17/2019	1002	Yes	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2
TDS (mg/L)	MW-4	894	n/a	4/17/2019	1465	Yes	20	n/a	n/a	0	n/a	n/a	n/a	0.004138	NP Inter (normality) 1 of 2

Exceeds Limit: MW-4

Prediction Limit  
Interval Non-parametric

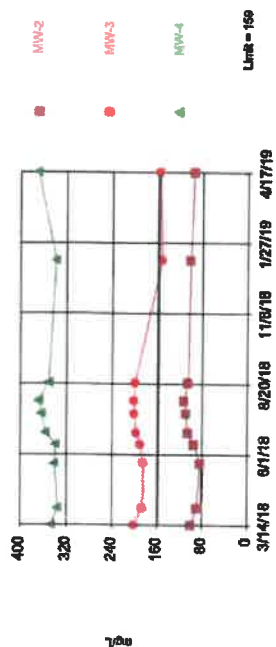


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Annual per-constituent alpha = 0.02457. Individual comparison alpha = 0.004138 (1 of 2). Comparing 3 points to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Calcium Analysis Run 7/29/2019 5:08 PM View: PL's Interval  
Muskegon Power Plant Client: OGE Energy Corp. Data: Muskegon Power Plant

Exceeds Limit: MW-4

Prediction Limit  
Interval Non-parametric

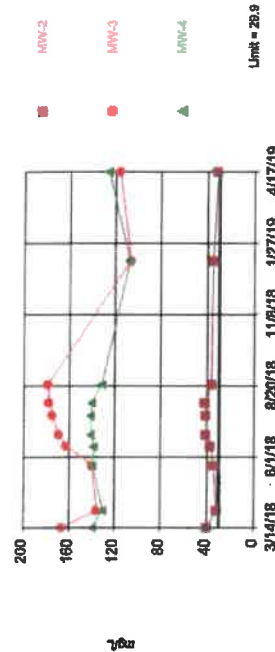


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Annual per-constituent alpha = 0.02457. Individual comparison alpha = 0.004138 (1 of 2). Comparing 3 points to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Sulfate Analysis Run 7/29/2019 5:08 PM View: PL's Interval  
Muskegon Power Plant Client: OGE Energy Corp. Data: Muskegon Power Plant

Exceeds Limit: MW-2, MW-3, MW-4

Prediction Limit  
Interval Non-parametric

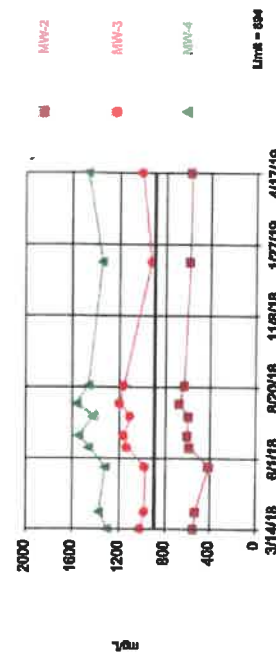


Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Annual per-constituent alpha = 0.02457. Individual comparison alpha = 0.004138 (1 of 2). Comparing 3 points to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: Chloride Analysis Run 7/29/2019 5:08 PM View: PL's Interval  
Muskegon Power Plant Client: OGE Energy Corp. Data: Muskegon Power Plant

Exceeds Limit: MW-3, MW-4

Prediction Limit  
Interval Non-parametric



Non-parametric test used in lieu of parametric prediction limit because the Shapiro Wilk normality test showed the data to be non-normal at the 0.01 alpha level. Limit is highest of 20 background values. Annual per-constituent alpha = 0.02457. Individual comparison alpha = 0.004138 (1 of 2). Comparing 3 points to limit. Insufficient data to test for seasonality; data will not be deseasonalized.

Constituent: TDS Analysis Run 7/29/2019 5:08 PM View: PL's Interval  
Muskegon Power Plant Client: OGE Energy Corp. Data: Muskegon Power Plant

## Prediction Limit

Constituent: Calcium (mg/L) Analysis Run 7/29/2019 5:08 PM View: PL's Interwell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-4	MW-3	MW-5 (bg)	MW-2
3/14/2018	116	331	238	202	127
4/3/2018	112	326	228	212	124
5/23/2018	96	292	198	182	106
6/14/2018	112	340	236	204	128
6/27/2018	109	336	242	207	132
7/19/2018	110	345	238	203	132
8/2/2018	106	329	225	194	131
8/23/2018	110	320	233	194	136
1/8/2019	107	317	198	199	134
4/17/2019	108	333	203	196	133

## Prediction Limit

Constituent: Chloride (mg/L) Analysis Run 7/28/2019 5:08 PM View: PL's Interwell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-4	MW-3	MW-5 (bg)	MW-2
3/14/2018	1.68	139	166	29.9	39.2
4/3/2018	1.21	130	135	23	31.6
5/23/2018	0.881	139	140	25	34.1
6/14/2018	0.0822	138	162	24.6	36.3
6/27/2018	0.715	141	169	24.6	40.1
7/19/2018	0.597	141	174	23.8	40.8
8/2/2018	0.632	140	177	24	41
8/23/2018	0.646	131	178	23.2	36.2
1/8/2019	<0.5	107	106	19.8	34.6
4/17/2019	0.675	126	116	21.8	31



## Prediction Limit

Constituent: Sulfate (mg/L) Analysis Run 7/29/2019 5:08 PM View: PL's Interwell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-4	MW-3	MW-5 (bg)	MW-2
3/14/2018	22	347	200	159	98.3
4/3/2018	19.7	335	185	145	88.7
5/23/2018	14.9	341	184	144	83.4
6/14/2018	12.8	339	188	144	94.5
6/27/2018	8.98	357	196	148	106
7/19/2018	7.13	363	200	147	109
8/2/2018	6.9	368	200	148	112
8/23/2018	6.82	351	198	136	105
1/8/2019	6.07	338	162	139	101
4/17/2019	10.8	389	156	149	94.8

## Prediction Limit

Constituent: TDS (mg/L) Analysis Run 7/29/2019 5:08 PM View: PL's Interwell  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

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	MW-1 (bg)	MW-4	MW-3	MW-5 (bg)	MW-2
3/14/2018	424	1300	1010	826	544
4/3/2018	392	1370	976	830	522
5/23/2018	386	1320	970	824	406
6/14/2018	413	1454	1127	867	580
6/27/2018	397	1535	1155	877	603
7/19/2018	369	1420	1102	839	595
8/2/2018	425	1557	1199	894	675
8/23/2018	400	1460	1156	831	631
1/8/2019	365	1348	920	723	578
4/17/2019	388	1465	1002	844	568

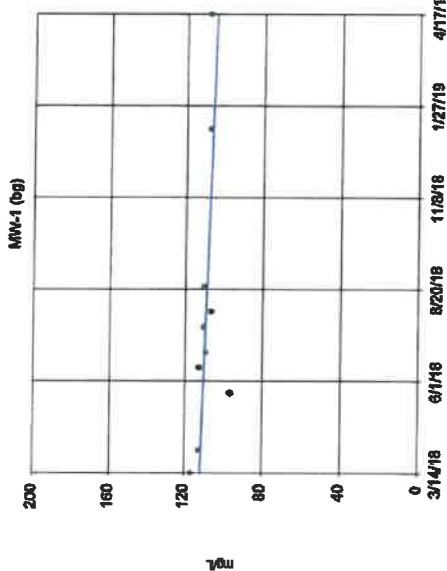
Trend Test Summary Table - Significant Results

Muskogee Power Plant		Client: OGE Energy Corp.		Data: Muskogee Power Plant		Printed 7/29/2019, 8:21 PM					
<u>Constituent</u>	<u>Well</u>	<u>Slope</u>	<u>Calc.</u>	<u>Critical</u>	<u>Sig.</u>	<u>N</u>	<u>%NDs</u>	<u>Normality</u>	<u>Xform</u>	<u>Alpha</u>	<u>Method</u>
Sulfate (mg/L)	MW-1 (bg)	-30.69	-35	-30	Yes	10	0	n/a	n/a	0.01	NP

## Trend Test Summary Table - All Results

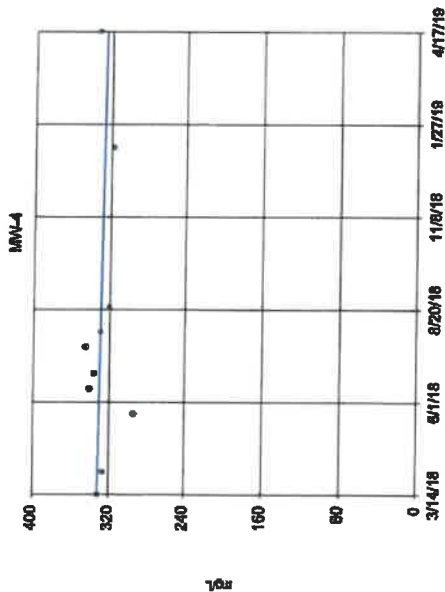
Muskogee Power Plant    Client: OGE Energy Corp.    Data: Muskogee Power Plant    Printed 7/29/2019, 8:21 PM

Constituent	Well	Slope	Calc.	Critical	Sig.	N	%NDs	Normality	Xform	Alpha	Method
Calcium (mg/L)	MW-1 (bg)	-8.329	-17	-30	No	10	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-4	-5.177	-3	-30	No	10	0	n/a	n/a	0.01	NP
Calcium (mg/L)	MW-5 (bg)	-8.511	-12	-30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-1 (bg)	-0.9255	-23	-30	No	10	10	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-2	-0.6214	-1	-30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-3	27.04	7	30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-4	-11.89	-11	-30	No	10	0	n/a	n/a	0.01	NP
Chloride (mg/L)	MW-5 (bg)	-6.636	-26	-30	No	10	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-1 (bg)	0	4	30	No	10	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-4	0.02483	10	30	No	10	0	n/a	n/a	0.01	NP
Fluoride (mg/L)	MW-5 (bg)	0	1	30	No	10	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-1 (bg)	-36.89	-35	-30	Yes	10	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-4	31.05	17	30	No	10	0	n/a	n/a	0.01	NP
Sulfate (mg/L)	MW-5 (bg)	-7.3	-5	-30	No	10	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-1 (bg)	-32.93	-11	-30	No	10	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-3	35.5	5	30	No	10	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-4	160.9	19	30	No	10	0	n/a	n/a	0.01	NP
TDS (mg/L)	MW-5 (bg)	13.48	7	30	No	10	0	n/a	n/a	0.01	NP



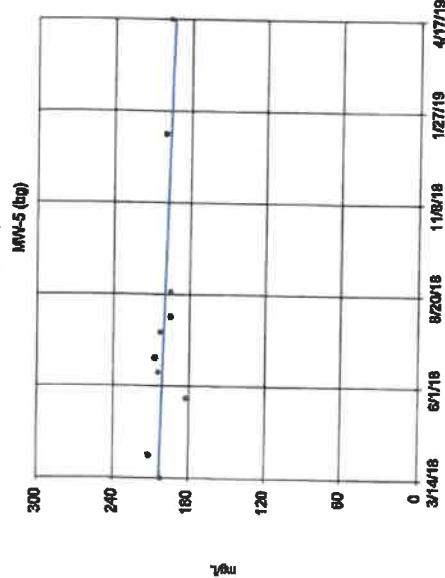
$n = 10$   
Slope = -0.323  
units per year.  
Mean-Kendall  
statistic = -0.17  
critical = -0.80  
Trend not sig-  
nificant at 95%  
confidence level  
( $\alpha = 0.005$  per  
test).

Constituent: Calcium  
Mustogee Power Plant  
Analysis Run 7/29/2019 5:37 PM  
Client: OGE Energy Corp. Data: Mustogee Power Plant  
View: Trend Testing



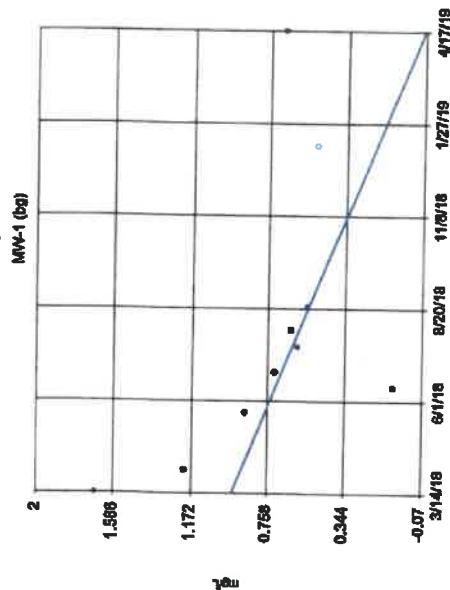
$n = 10$   
Slope = -5.177  
units per year.  
Mean-Kendall  
statistic = -3  
critical = -30  
Trend not sig-  
nificant at 95%  
confidence level  
( $\alpha = 0.005$  per  
tail).

Constituent: Calcium Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Mustogee Power Plant Client: OGE Energy Corp. Data: Mustogee Power Plant



$R^2 = 10$   
Slope = -0.311  
units per year.  
Mann-Kendall  
statistic = -12  
critical = -3.0  
Trend not sig-  
nificant at 95%  
confidence level  
is 0.005 per  
year.

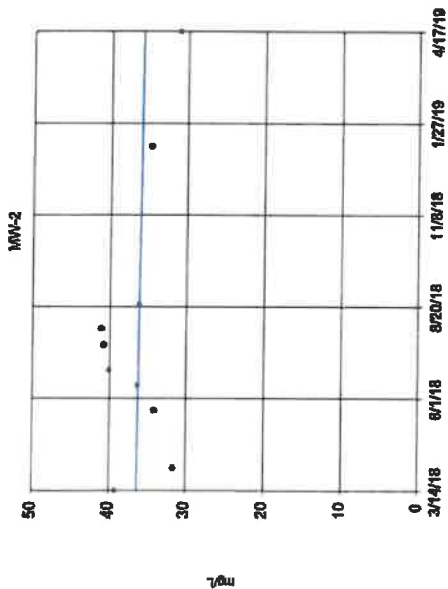
Constituent: Calcium  
Mustogee Power Plant  
Analysis Run 7/28/2019 5:37 PM View: Trend Testing  
Client: OGE Energy Corp. Data: Mustogee Power Plant



$n = 10$   
Slope = -0.0255  
units per year.  
Mann-Kendall  
statistic = -23  
critical = -30  
Trend not sig-  
nificant at 99%  
confidence level  
( $\alpha = 0.005$  per  
test).

Constituent: Chloride  
Muskogee Power Plant  
Analysis Run 7/28/2019 5:37 PM View: Trend Testing  
Client: OGE Energy Corp. Data: Muskogee Power Plant

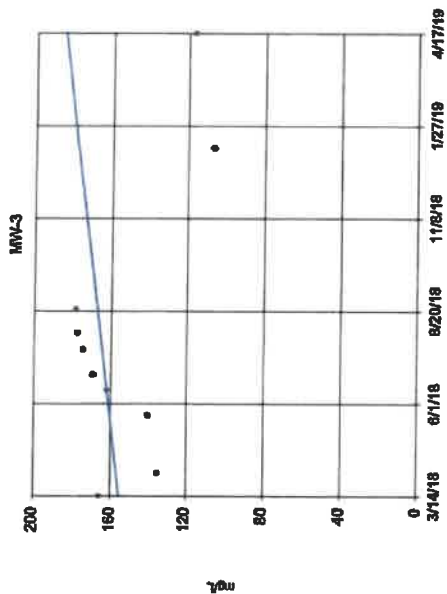
### Sen's Slope Estimator



n = 10  
Slope = -0.0214  
units per year.  
Mann-Kendall  
statistic = -1  
critical = -30  
Trend not sig-  
nificant at 95%  
confidence level  
(p = 0.005 per  
test).

Constituent: Chloride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

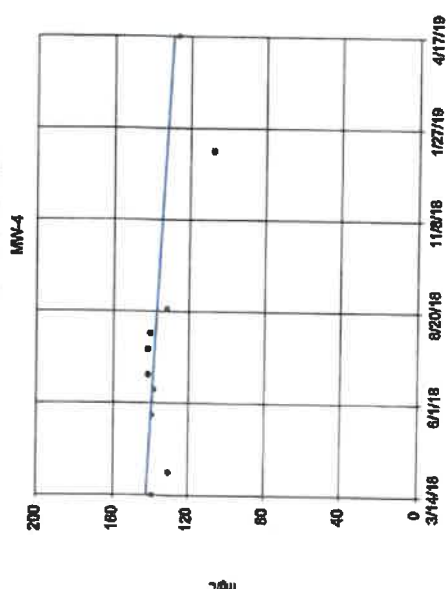
### Sen's Slope Estimator



n = 10  
Slope = -27.04  
units per year.  
Mann-Kendall  
statistic = -7  
critical = -30  
Trend not sig-  
nificant at 95%  
confidence level  
(p = 0.005 per  
test).

Constituent: Chloride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

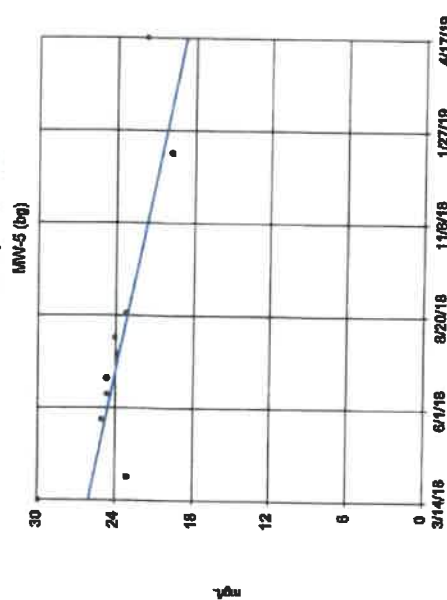
### Sen's Slope Estimator



n = 10  
Slope = -11.89  
units per year.  
Mann-Kendall  
statistic = -11  
critical = -30  
Trend not sig-  
nificant at 95%  
confidence level  
(p = 0.005 per  
test).

Constituent: Chloride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

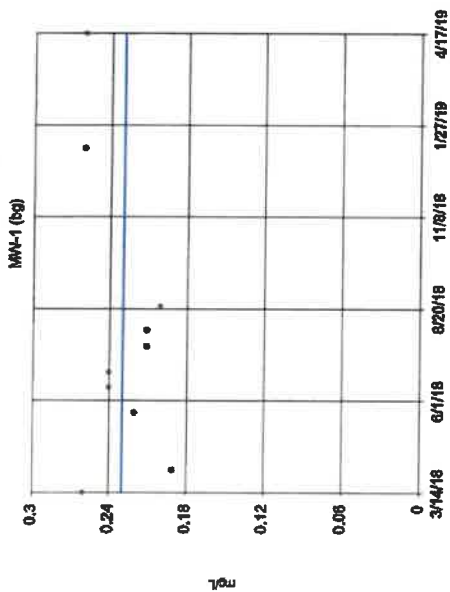
### Sen's Slope Estimator



n = 10  
Slope = -4.535  
units per year.  
Mann-Kendall  
statistic = -25  
critical = -30  
Trend not sig-  
nificant at 95%  
confidence level  
(p = 0.005 per  
test).

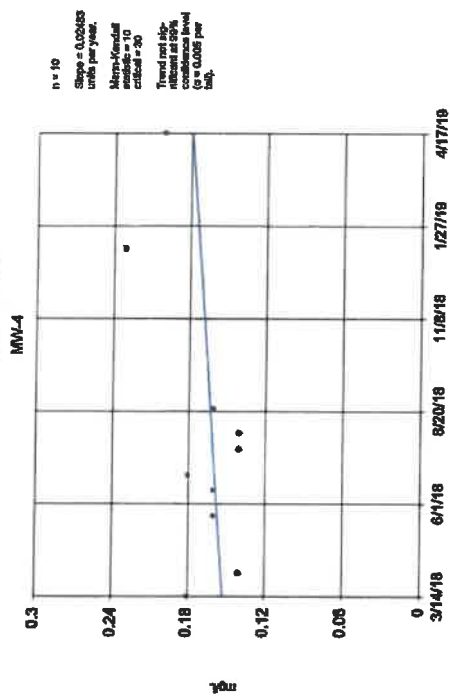
Constituent: Chloride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Sen's Slope Estimator



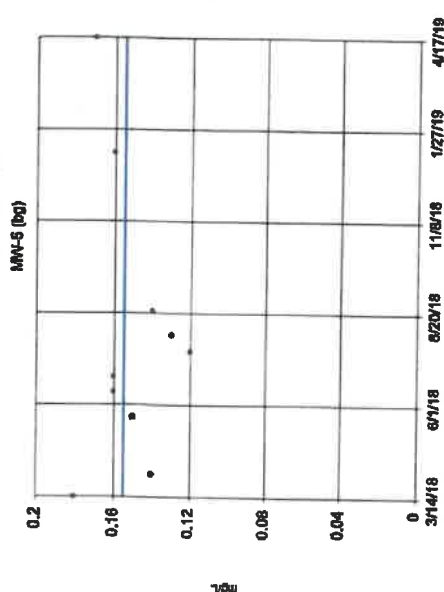
Constituent: Fluoride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Sen's Slope Estimator



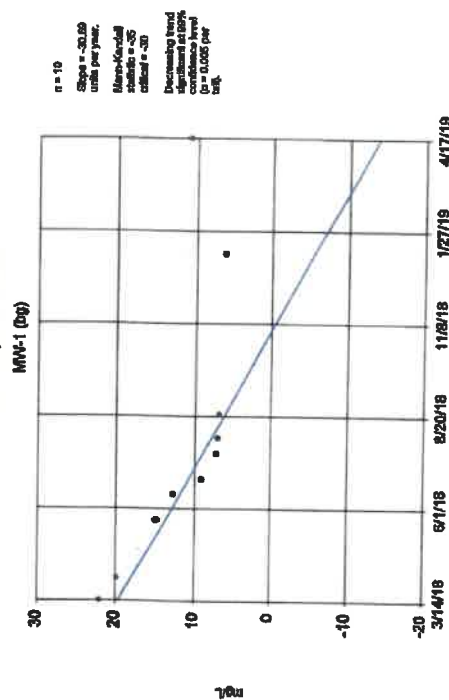
Constituent: Fluoride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Sen's Slope Estimator



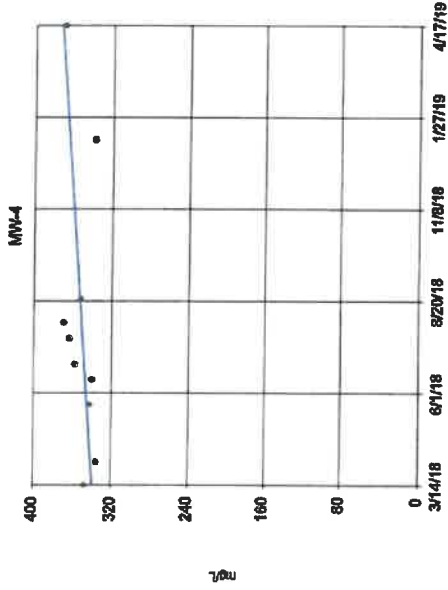
Constituent: Fluoride Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

### Sen's Slope Estimator



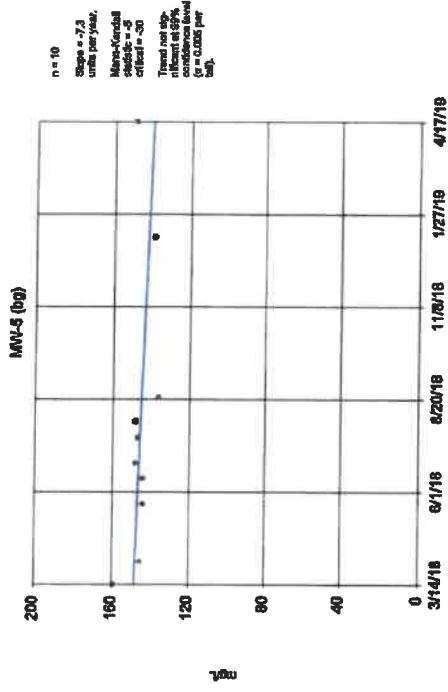
Constituent: Sulfate Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

# Sen's Slope Estimator



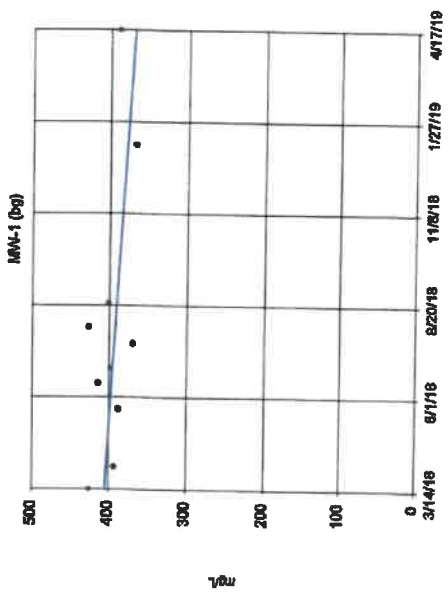
Constituent: Sulfate Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

# Sen's Slope Estimator



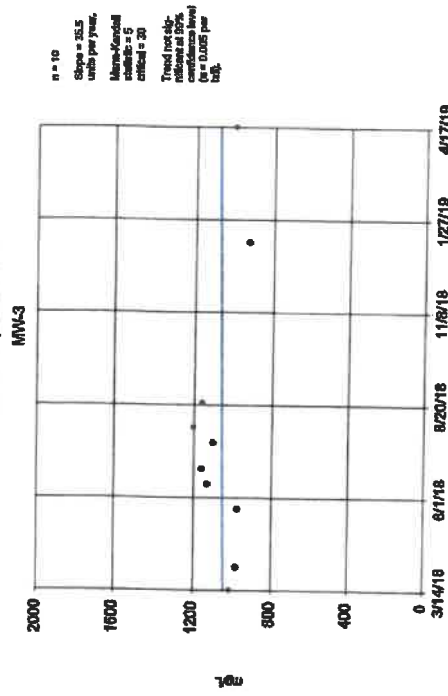
Constituent: Sulfate Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

# Sen's Slope Estimator



Constituent: TDS Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

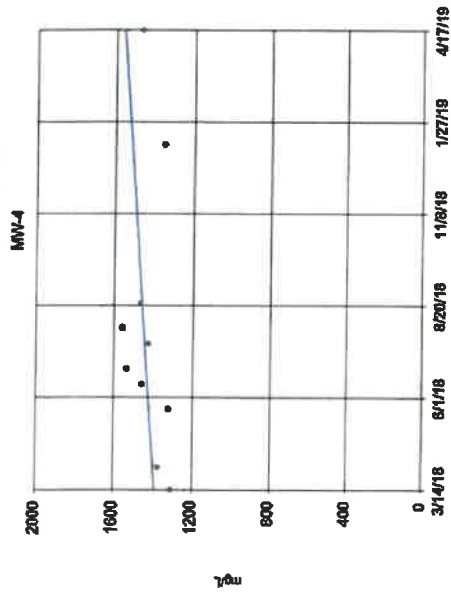
# Sen's Slope Estimator



Constituent: TDS Analysis Run 7/29/2019 5:37 PM View: Trend Testing  
Muskogee Power Plant Client: OGE Energy Corp. Data: Muskogee Power Plant

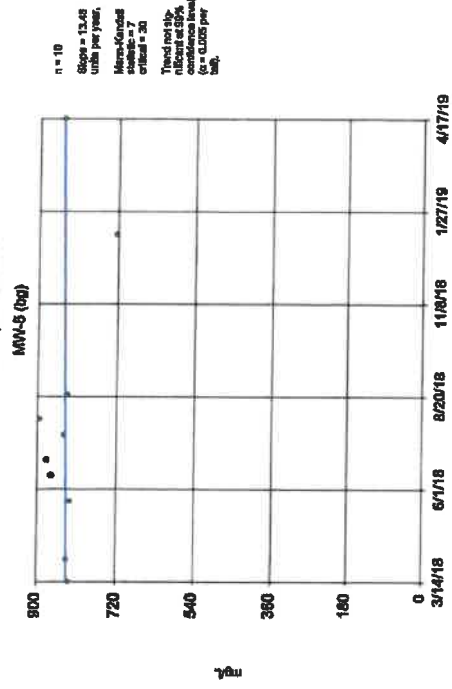


### Sen's Slope Estimator



Constituent: TDS Analysis Run 7/28/2019 5:37 PM View: Trend Testing  
Mustogee Power Plant Client: OGE Energy Corp. Data: Mustogee Power Plant

### Sen's Slope Estimator



Constituent: TDS Analysis Run 7/28/2019 5:37 PM View: Trend Testing  
Mustogee Power Plant Client: OGE Energy Corp. Data: Mustogee Power Plant

**CONTINUE TO PART II**

**ANNUAL GROUND WATER MONITORING REPORT**